JS 44 (Rev. 12/12)

CIVIL COVER SHEET

The JS 44 civil cover sheet and the information contained herein neither replace nor supplement the filing and service of pleadings or other papers as required by law, except as provided by local rules of court. This form, approved by the Judicial Conference of the United States in September 1974, is required for the use of the Clerk of Court for the purpose of initiating the civil docket sheet. *(SEE INSTRUCTIONS ON NEXT PAGE OF THIS FORM.)*

I. (a) PLAINTIFFS

Duckweed, USA, Inc.

(b) County of Residence of First Listed Plaintiff Camden (NJ)
(EXCEPT IN U.S. PLAINTIFF CASES)

(c) Attorneys *(Firm Name, Address, and Telephone Number)*

See attached

DEFENDANTS

Rudolph Behrens, et al.

County of Residence of First Listed Defendant Montgomery (PA)
(IN U.S. PLAINTIFF CASES ONLY)

NOTE: IN LAND CONDEMNATION CASES, USE THE LOCATION OF THE TRACT OF LAND INVOLVED.

Attorneys *(If Known)*

II. BASIS OF JURISDICTION *(Place an "X" in One Box Only)*

- ☐ 1 U.S. Government Plaintiff
- ☒ 3 Federal Question *(U.S. Government Not a Party)*
- ☐ 2 U.S. Government Defendant
- ☐ 4 Diversity *(Indicate Citizenship of Parties in Item III)*

III. CITIZENSHIP OF PRINCIPAL PARTIES *(Place an "X" in One Box for Plaintiff and One Box for Defendant)*

(For Diversity Cases Only)

	PTF	DEF		PTF	DEF
Citizen of This State	☐ 1	☐ 1	Incorporated *or* Principal Place of Business In This State	☐ 4	☐ 4
Citizen of Another State	☐ 2	☐ 2	Incorporated *and* Principal Place of Business In Another State	☐ 5	☐ 5
Citizen or Subject of a Foreign Country	☐ 3	☐ 3	Foreign Nation	☐ 6	☐ 6

IV. NATURE OF SUIT *(Place an "X" in One Box Only)*

CONTRACT
- ☐ 110 Insurance
- ☐ 120 Marine
- ☐ 130 Miller Act
- ☐ 140 Negotiable Instrument
- ☐ 150 Recovery of Overpayment & Enforcement of Judgment
- ☐ 151 Medicare Act
- ☐ 152 Recovery of Defaulted Student Loans (Excludes Veterans)
- ☐ 153 Recovery of Overpayment of Veteran's Benefits
- ☐ 160 Stockholders' Suits
- ☐ 190 Other Contract
- ☐ 195 Contract Product Liability
- ☐ 196 Franchise

REAL PROPERTY
- ☐ 210 Land Condemnation
- ☐ 220 Foreclosure
- ☐ 230 Rent Lease & Ejectment
- ☐ 240 Torts to Land
- ☐ 245 Tort Product Liability
- ☐ 290 All Other Real Property

TORTS

PERSONAL INJURY
- ☐ 310 Airplane
- ☐ 315 Airplane Product Liability
- ☐ 320 Assault, Libel & Slander
- ☐ 330 Federal Employers' Liability
- ☐ 340 Marine
- ☐ 345 Marine Product Liability
- ☐ 350 Motor Vehicle
- ☐ 355 Motor Vehicle Product Liability
- ☐ 360 Other Personal Injury
- ☐ 362 Personal Injury - Medical Malpractice

PERSONAL INJURY
- ☐ 365 Personal Injury - Product Liability
- ☐ 367 Health Care/ Pharmaceutical Personal Injury Product Liability
- ☐ 368 Asbestos Personal Injury Product Liability

PERSONAL PROPERTY
- ☐ 370 Other Fraud
- ☐ 371 Truth in Lending
- ☐ 380 Other Personal Property Damage
- ☐ 385 Property Damage Product Liability

CIVIL RIGHTS
- ☐ 440 Other Civil Rights
- ☐ 441 Voting
- ☐ 442 Employment
- ☐ 443 Housing/ Accommodations
- ☐ 445 Amer. w/Disabilities - Employment
- ☐ 446 Amer. w/Disabilities - Other
- ☐ 448 Education

PRISONER PETITIONS

Habeas Corpus:
- ☐ 463 Alien Detainee
- ☐ 510 Motions to Vacate Sentence
- ☐ 530 General
- ☐ 535 Death Penalty

Other:
- ☐ 540 Mandamus & Other
- ☐ 550 Civil Rights
- ☐ 555 Prison Condition
- ☐ 560 Civil Detainee - Conditions of Confinement

FORFEITURE/PENALTY
- ☐ 625 Drug Related Seizure of Property 21 USC 881
- ☐ 690 Other

LABOR
- ☐ 710 Fair Labor Standards Act
- ☐ 720 Labor/Management Relations
- ☐ 740 Railway Labor Act
- ☐ 751 Family and Medical Leave Act
- ☐ 790 Other Labor Litigation
- ☐ 791 Employee Retirement Income Security Act

IMMIGRATION
- ☐ 462 Naturalization Application
- ☐ 465 Other Immigration Actions

BANKRUPTCY
- ☐ 422 Appeal 28 USC 158
- ☐ 423 Withdrawal 28 USC 157

PROPERTY RIGHTS
- ☐ 820 Copyrights
- ☒ 830 Patent
- ☐ 840 Trademark

SOCIAL SECURITY
- ☐ 861 HIA (1395ff)
- ☐ 862 Black Lung (923)
- ☐ 863 DIWC/DIWW (405(g))
- ☐ 864 SSID Title XVI
- ☐ 865 RSI (405(g))

FEDERAL TAX SUITS
- ☐ 870 Taxes (U.S. Plaintiff or Defendant)
- ☐ 871 IRS—Third Party 26 USC 7609

OTHER STATUTES
- ☐ 375 False Claims Act
- ☐ 400 State Reapportionment
- ☐ 410 Antitrust
- ☐ 430 Banks and Banking
- ☐ 450 Commerce
- ☐ 460 Deportation
- ☐ 470 Racketeer Influenced and Corrupt Organizations
- ☐ 480 Consumer Credit
- ☐ 490 Cable/Sat TV
- ☐ 850 Securities/Commodities/ Exchange
- ☐ 890 Other Statutory Actions
- ☐ 891 Agricultural Acts
- ☐ 893 Environmental Matters
- ☐ 895 Freedom of Information Act
- ☐ 896 Arbitration
- ☐ 899 Administrative Procedure Act/Review or Appeal of Agency Decision
- ☐ 950 Constitutionality of State Statutes

V. ORIGIN *(Place an "X" in One Box Only)*

☒ 1 Original Proceeding ☐ 2 Removed from State Court ☐ 3 Remanded from Appellate Court ☐ 4 Reinstated or Reopened ☐ 5 Transferred from Another District *(specify)* ☐ 6 Multidistrict Litigation

VI. CAUSE OF ACTION

Cite the U.S. Civil Statute under which you are filing *(Do not cite jurisdictional statutes unless diversity)*:

Brief description of cause:
See attached

VII. REQUESTED IN COMPLAINT:

☐ CHECK IF THIS IS A CLASS ACTION UNDER RULE 23, F.R.Cv.P.

DEMAND $ 75,000.00 +

CHECK YES only if demanded in complaint:
JURY DEMAND: ☒ Yes ☐ No

VIII. RELATED CASE(S) IF ANY

(See instructions): JUDGE _____ DOCKET NUMBER _____

DATE 09/30/2015

SIGNATURE OF ATTORNEY OF RECORD

Peter J. Leyh, Esq.

FOR OFFICE USE ONLY

RECEIPT # _____ AMOUNT _____ APPLYING IFP _____ JUDGE _____ MAG. JUDGE _____

ATTACHMENT TO

CIVIL COVER SHEET

I. PLAINTIFFS

(c) Attorney's (Firm Name, Address, and Telephone Number)

David L. Braverman, Esquire
Peter J. Leyh, Esquire
Braverman Kaskey, P.C.
One Liberty Place, 56th Floor
1650 Market Street
Philadelphia, PA 19103
(215) 575-3800

VI. CAUSE OF ACTION

Brief description of cause:

Infringement of the Patent 494

UNITED STATES DISTRICT COURT

FOR THE EASTERN DISTRICT OF PENNSYLVANIA — DESIGNATION FORM to be used by counsel to indicate the category of the case for the purpose of assignment to appropriate calendar.

Address of Plaintiff: 4 South Cedar Avenue, Berlin, NJ 08009

Address of Defendant: 254 Liberty Court, Collegeville, PA 19426

Place of Accident, Incident or Transaction: N/A

(Use Reverse Side For Additional Space)

Does this civil action involve a nongovernmental corporate party with any parent corporation and any publicly held corporation owning 10% or more of its stock?

(Attach two copies of the Disclosure Statement Form in accordance with Fed.R.Civ.P. 7.1(a)) Yes☒ No☐

Does this case involve multidistrict litigation possibilities? Yes☐ No☒

RELATED CASE, IF ANY:

Case Number: _____ Judge _____ Date Terminated: _____

Civil cases are deemed related when yes is answered to any of the following questions:

1. Is this case related to property included in an earlier numbered suit pending or within one year previously terminated action in this court? Yes☐ No☒
2. Does this case involve the same issue of fact or grow out of the same transaction as a prior suit pending or within one year previously terminated action in this court? Yes☐ No☒
3. Does this case involve the validity or infringement of a patent already in suit or any earlier numbered case pending or within one year previously terminated action in this court? Yes☐ No☒
4. Is this case a second or successive habeas corpus, social security appeal, or pro se civil rights case filed by the same individual? Yes☐ No☒

CIVIL: (Place ✔ in ONE CATEGORY ONLY)

A. *Federal Question Cases:*

1. ☐ Indemnity Contract, Marine Contract, and All Other Contracts
2. ☐ FELA
3. ☐ Jones Act-Personal Injury
4. ☐ Antitrust
5. ☐ Patent
6. ☐ Labor-Management Relations
7. ☐ Civil Rights
8. ☐ Habeas Corpus
9. ☐ Securities Act(s) Cases
10. ☐ Social Security Review Cases
11. ☒ All other Federal Question Cases

(Please specify) _____

B. *Diversity Jurisdiction Cases:*

1. ☐ Insurance Contract and Other Contracts
2. ☐ Airplane Personal Injury
3. ☐ Assault, Defamation
4. ☐ Marine Personal Injury
5. ☐ Motor Vehicle Personal Injury
6. ☐ Other Personal Injury (Please specify)
7. ☐ Products Liability
8. ☐ Products Liability — Asbestos
9. ☐ All other Diversity Cases

(Please specify) _____

ARBITRATION CERTIFICATION

(Check Appropriate Category)

I, _____, counsel of record do hereby certify:

☒ Pursuant to Local Civil Rule 53.2, Section 3(c)(2), that to the best of my knowledge and belief, the damages recoverable in this civil action case exceed the sum of $150,000.00 exclusive of interest and costs;

☐ Relief other than monetary damages is sought.

DATE: 9/30/15 _____ Attorney-at-Law Peter J. Leyh, Esq. #58930 Attorney I.D.#

NOTE: A trial de novo will be a trial by jury only if there has been compliance with F.R.C.P. 38.

I certify that, to my knowledge, the within case is not related to any case now pending or within one year previously terminated action in this court except as noted above.

DATE: _____ _____ Attorney-at-Law _____ Attorney I.D.#

CIV. 609 (5/2012)

APPENDIX G

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF PENNSYLVANIA

Duckweed, USA, Inc. :
:
V. : Civil Action
Rudolph Behrens, et al. : No: _____
:

DISCLOSURE STATEMENT FORM

Please check one box:

☒ The nongovernmental corporate party, Duckweed, USA, Inc. , in the above listed civil action does not have any parent corporation and publicly held corporation that owns 10% or more of its stock.

☐ The nongovernmental corporate party, _____ , in the above listed civil action has the following parent corporation(s) and publicly held corporation(s) that owns 10% or more of its stock:

_____
_____
_____
_____

9/30/2015 _____
Date Signature

Counsel for: Plaintiff, Duckweed, USA, Inc.

Federal Rule of Civil Procedure 7.1 Disclosure Statement

(a) WHO MUST FILE; CONTENTS. A nongovernmental corporate party must file two copies of a disclosure statement that:

(1) identifies any parent corporation and any publicly held corporation owning10% or more of its stock; or

(2) states that there is no such corporation.

(b) TIME TO FILE; SUPPLEMENTAL FILING. A party must:

(1) file the disclosure statement with its first appearance, pleading, petition, motion, response, or other request addressed to the court; and

(2) promptly file a supplemental statement if any required information changes.

UNITED STATE DISTRICT COURT
EASTERN DISTRICT OF PENNSYLVANIA

Duckweed, USA, Inc.	:	Criminal Action
	:	
v.	:	
	:	
Rudolph Behrens, et al.	:	No.

DISCLOSURE STATEMENT FORM

Please check one box:

☒ The nongovernmental corporate party, Duckweed, USA, Inc., in the above listed criminal action does not have any parent corporation and publicly held corporation that owns 10% or more of its stock.

☐ The nongovernmental corporate party, _____, in the above listed criminal action has the following parent corporation(s) and publicly held corporation(s) that owns 10% or more of its stock:

_____
_____
_____
_____

9/30/2015
Date

Signature

Counsel for: Plaintiff, Duckweed, USA, Inc.

Federal Rule of Criminal Procedure 12.4 Disclosure Statement

(a) WHO MUST FILE.
- (1) NONGOVERNMENTAL CORPORATE PARTY. Any nongovernmental corporate party to a proceeding in a district court must file a statement that identifies any parent corporation and any publicly held corporation that owns 10% or more of its stock or states that there is no such corporation.
- (2) ORGANIZATIONAL VICTIM. If an organization is a victim of the alleged criminal activity, the government must file a statement identifying the victim. If the organizational victim is a corporation, the statement must also disclose the information required by Rule 12.4(a)(1) to the extent that it can be obtained through due diligence.

(b) TIME FOR FILING; SUPPLEMENTAL FILING. A party must:
- (1) file the Rule 12.4(a) statement upon the defendant's initial appearance; and
- (2) promptly file a supplemental statement upon any change in the information that the statement requires.

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF PENNSYLVANIA

CASE MANAGEMENT TRACK DESIGNATION FORM

Duckweed, USA, Inc.	:	CIVIL ACTION
v.	:	
Rudolph Behrens, et al.	:	NO.

In accordance with the Civil Justice Expense and Delay Reduction Plan of this court, counsel for plaintiff shall complete a Case Management Track Designation Form in all civil cases at the time of filing the complaint and serve a copy on all defendants. (See § 1:03 of the plan set forth on the reverse side of this form.) In the event that a defendant does not agree with the plaintiff regarding said designation, that defendant shall, with its first appearance, submit to the clerk of court and serve on the plaintiff and all other parties, a Case Management Track Designation Form specifying the track to which that defendant believes the case should be assigned.

SELECT ONE OF THE FOLLOWING CASE MANAGEMENT TRACKS:

(a) Habeas Corpus – Cases brought under 28 U.S.C. § 2241 through § 2255. ( )

(b) Social Security – Cases requesting review of a decision of the Secretary of Health and Human Services denying plaintiff Social Security Benefits. ( )

(c) Arbitration – Cases required to be designated for arbitration under Local Civil Rule 53.2. ( )

(d) Asbestos – Cases involving claims for personal injury or property damage from exposure to asbestos. ( )

(e) Special Management – Cases that do not fall into tracks (a) through (d) that are commonly referred to as complex and that need special or intense management by the court. (See reverse side of this form for a detailed explanation of special management cases.) ( )

(f) Standard Management – Cases that do not fall into any one of the other tracks. (X)

9/30/2015	Peter J. Leyh, Esq.	Duckweed, USA, Inc.
Date	**Attorney-at-law**	**Attorney for**
(215) 575-3800	215-575-3801	pleyh@braverlaw.com
Telephone	**FAX Number**	**E-Mail Address**

(Civ. 660) 10/02

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF PENNSYLVANIA

DUCKWEED, USA, INC.,	:	
	:	
Plaintiff,	:	
v.	:	**CIVIL ACTION NO.:**
	:	
RUDOLPH BEHRENS,	:	**JURY TRIAL DEMANDED**
EDWARD ABRAHAM,	:	
JOSEPH KEARNEY and	:	
B.E.A.R. OCEANICS,	:	
	:	
Defendants.	:	

COMPLAINT

Plaintiff Duckweed, USA, Inc., by its undersigned attorneys, assert claims against defendants Rudolph Behrens, Edward Abraham, Joseph Kearney and B.E.A.R. Oceanics, and in support thereof allege as follows:

INTRODUCTION

1. DWUSA is the legal holder of an exclusive license to develop, market and license patented new technologies and processes that produce a cost effective, clean and renewable petroleum oil substitute from algae, waste water or vegetable oils. These new technologies represent a major breakthrough in clean energy production because they are the first that can deliver clean energy at a cost equal to or below traditional pollution causing methods. After much research, development, effort and expense, DWUSA is on the threshold of bringing this these revolutionary technologies and processes to the marketplace. However, the defendants, who include the inventor/licensor of the patented technologies and processes, have engaged and continue to engage in an unlawful and systematic effort to infringe DWUSA's patent rights, put it out of business, and

steal DWUSA's opportunities for themselves. Unless they are stopped by this Court, they will soon succeed in doing so, albeit improperly and unlawfully.

PARTIES

2. Plaintiff, Duckweed USA, Inc. ("DWUSA") is a New Jersey corporation with a principal place of business located at 4 South Cedar Avenue, Berlin, NJ 08009.

3. Defendant, Rudolph Behrens, is an individual residing at 254 Liberty Court, Collegeville, PA 19426.

4. Defendant, Edward Abraham, is an individual residing at 229 Evergreen Hollow Road, Effort, PA 18330.

5. Defendant, Joseph Kearney, is an individual residing at 415 Wyoming Avenue, Wyoming, PA 18644.

6. Defendant B.E.A.R. Oceanics ("BEAR") is a Pennsylvania corporation with a principal place of business located at 254 Liberty Court, Collegeville, PA 19426. Upon information and belief, Behrens, Abraham and Kearney are principals of BEAR.

JURISDICTION AND VENUE

7. The Court has jurisdiction over this matter pursuant to 28 U.S.C. Sections 1331 and 1338(a) because this action arises under the patent laws of the United States, including 35 U.S.C. Section 271.

8. In addition, this Court has jurisdiction of this matter pursuant to 28 U.S.C. Section 1332 because the plaintiff and all of the defendants are citizens of different states, and the amount in controversy in this matter, exclusive of interest and costs, exceeds $75,000.

9. Venue is proper in this judicial district pursuant to 28 U.S.C. Sections 1391 and 1400(b), in that, among other things, all defendants reside here.

THE PATENT-IN-SUIT

10. Paragraphs 1 through 9 are incorporated by reference as if fully set forth herein.

11. On July 6, 2010, the patent-in-suit, United States Patent No. 7,750,494 BI (the "494 Patent"), titled "Systems and Vessels for Producing Hydrocarbons and/or Water, and Methods for Same," was duly and lawfully issued by the United States Patent and Trademark Office (the "PTO"). A copy of the 494 Patent is attached hereto as Exhibit A.

12. DWUSA is the lawful holder of a written exclusive license to develop, market, and license commercial synfuel (synthetic fuel) feedstock facilities utilizing the system for producing hydrocarbons from wind energy, water and algae that is claimed in the 494 Patent. As such, it is the assignee of all causes of action and enforcement rights of any kind within the scope of its license, including without limitation, the right to collect damages for past and future infringement and to seek injunctive relief.

FACTUAL BACKGROUND

13. Paragraphs 1 through 12 are incorporated by reference as if fully set forth herein.

14. DWUSA was formed in November 2012 to develop and market emerging aquatic biomass clean-energy technologies. Among other things, it is the exclusive developer, marketer and licensor of a patented technology, covered in the Patent, that produces a cost effective, clean, and renewable petroleum oil substitute from algae, waste water or vegetable oils.

15. DWUSA calls this breakthrough technology, which converts aquatic biomass into sulfur-free petroleum oil substitute without the use of any harsh chemicals, high-heat or pollution

producing processes, Hydrodynamic Reformation ("HDR"). Instead of oil being extracted from the aquatic biomass as in traditional processes, HDR converts the organic compounds of the algae or waste biomass into alkanes, which are chemically identical to the petroleum oil used to make gasoline, kerosene, diesel fuel, jet fuel, and heating oil.

16. Through HDR, DWUSA's synthetic fuel (or "synfuel") yields can far exceed any existing biomass to oil production methods, and can produce over 30 times the amount of oil per acre than the nearest competitor, making it the first synfuel process that can produce clean fuels to directly compete with petroleum products. Indeed, the petroleum oil substitute produced through the HDR process is so clean that for every barrel (42 gallons) of synfuel produced through the HDR process, 40 gallons of clean gasoline may be refined versus 19 gallons from Brent Crude, the highest grade of petroleum crude oil. Only solar and wind energy are used to power the synfuel creation processes.

Hydrodynamic Reformation of Organic Compounds

17 When algal or waste biomass is subjected to extreme pressure and temperature it will turn into petroleum. That is how natural petroleum is made, through plate tectonics which bring to bear millions of years of heat and pressure that change the molecular structure of hydrocarbons (fossils) into petroleum oil.

18 Other existing processes use heat and specialty machinery as a substitute for plate tectonics. Most methods use heat to raise the temperature of the wet algae above 1200 degrees Fahrenheit. In such a process, the machinery, called a super-critical reactor, is very complex and must use copious amounts of energy to heat the wet biomass. Five to six gallons of fuel is burned for every gallon of biofuel that is produced, causing more damage to the environment than the

benefits gained by that one gallon of biofuel. The process is cost prohibitive, and requires government subsidies for the biofuel industry to survive.

DWUSA's Unique Process

19 DWUSA's technology depends upon a natural phenomenon known as "cavitation." In cavitation, micro-bubbles form in the liquid mixture of water and algal or waste biomass. These micro-bubbles are momentarily at extremely high pressure and temperatures. They change the molecules of biomass hydrocarbons into petroleum just like plate tectonics change the molecular structure of fossil hydrocarbons into petroleum oil.

20. To accomplish this transformation, wet algae, waste biomass (or vegetable oil, like corn oil, soy oil, etc. used in the production of biodiesel fuel) is pumped through a specialized Linear Venturi Kinetic Nozzle ("LVKN"), which makes the fluid move very quickly. The LVKN Nozzle exposes the aquatic biomass to the same high pressures and temperatures as plate tectonics inside what is known as the "cavitation zone," which drives off oxygen molecules and adds hydrogen. The elements of the living proteins and carbohydrates are thus transformed into alkanes, which are the chemical compounds found in petroleum. It is virtually a "one-for-one" conversion – i.e., one organic molecule becomes one alkane molecule.

21. DWUSA has developed two synfuel production systems utilizing the HDR process, known as the "Aurora, " or algae to oil, and the "Alchemy," or waste biomass to oil, systems.

The "Aurora" Production System

22. In the Aurora System, an aggressive growing blend of algae is cultivated in tanks enclosed in small, modular greenhouses. Each greenhouse is set up to independently cultivate and process algae into bio-oil. The automatically harvested oil steadily flows into holding tanks 24 hours

a day, seven days a week.

23. The greenhouses are set in ganged rows of six units. Five units are outfitted with growing tanks and a sixth double-height unit contains the processing equipment and a sumac tree that provides additional carbon dioxide to the greenhouses, enhancing the algal growth. The six-unit greenhouse frame consists of 2" painted steel struts and hubs that are precast for easy assembly. The greenhouse enclosure skin is a fire-rated 20 mil high density polyethylene laminate, which is the same material used to make high altitude weather balloons.

24. The faceted design of the greenhouses optimizes sunlight year round and is entirely self-sufficient, operating only on solar and wind power. Approximately 20 to 25 greenhouses fit on one acre of land and each greenhouse yields 40 to 50 gallons of bio-oil daily. Thus, upwards of 340,000 gallons per acre annually of a clean petroleum oil substitute is produced. In essence, the Aurora System creates an "oil well" that never dries up. In the simplest of terms, it is "farming for oil."

The "Alchemy" Production System

25. Throughout the South and in remote locations across the United States, many towns use settling ponds or lagoons to collect municipal sewage as part of their waste water treatment process. In most cases, duckweed and algae grow and collect in these ponds, posing a problem for water treatment facilities that requires expensive control systems.[1]

26. Together with the the sewage, the duckweed and algae growth in the settling lagoons provide an ideal biomass source for the HDR process. By simply pumping the wet biomass through

[1] Duckweed is a family of aquatic plants that float on the surface of lakes and waterways worldwide. It grows in a variety of climates from Siberia to the tropics, and is a fertile source of biomass for use in the HDR process.

the LVKN Nozzle, the hydrocarbons (plant and waste biomass) are converted to alkanes or clean, sulfur-free oil. The beauty of the Alchemy System is that the sewage is replenished daily, so there is no need to build a growing facility to cultivate the aquatic biomass, making it a very cost effective system to install and operate.

DWUSA's Exclusive License

27. Behrens, together with his children Todd, Courtney and Derek, are listed in the 494 Patent as the "inventors." *See* Exhibit A. Rudolph Behrens is identified in the 494 Patent as the "assignee." *Id.* As mentioned, the 494 Patent was duly and lawfully issued by the PTO on July 6, 2010. *Id.*

28. In or about October, 2013, Behrens and Michael Rigolizzo, who is one of DWUSA's founding principals (and its CEO and President), began a series of discussions, meetings and negotiations during which Behrens proposed that he and DWUSA partner to develop, market and license the synfuel production system covered by the Patent, in which Behrens would supply his technical expertise and intellectual property in the form of a license to use the 494 Patent for oil and electricity production.

29. The negotiations culminated in a written agreement between Behrens and DWUSA, entitled "Resolution," pursuant to which, among other things:

a) Behrens was: (i) appointed a Vice President in DWUSA, (ii) issued 2,000 shares of DWUSA stock (equal to Rigolizzo and Stephanie Longo, DWUSA's other founder), (iii) given a 33% equity position in DWUSA (equal to Rigolizzo and Longo), and (iv) given a "50% voting privilege" in the business conducted by DWUSA;

b) In exchange, Behrens "contribute[d] his professional expertise and patented

process for synfuel production" referred to in the resolution as 'SF-1: Land-Based Synfuel Production System'"; and

c) In exchange, Behrens granted DWUSA an ***exclusive*** license to develop, market and license commercial synfuel feedstock facility(s), utilizing the "SF-1: Land-Based Synfuel Production System" covered by the 494 Patent.

30. A true and correct copy of the Resolution, which was executed by Behrens on October 26, 2013, is attached hereto as Exhibit B.

DWUSA's Efforts to Develop and Market the System

31. Following execution of the Resolution, DWUSA's primary focus has been to develop and construct a commercial synfuel feedstock facility at a site in Winslow Township, New Jersey, showcasing the Aurora System (the "Winslow Site"), and an Alchemy System project at the Sparta Waste Water Treatment facility in Sparta, Georgia (the "Sparta Facility"). Critical to the funding of these projects, DWUSA also has developed a relationship with Rutgers University's "Aquaculture Innovation Center for Environment and Natural Resources," in Cape May, New Jersey (the "Rutgers Center"), and for the past year has been developing and implementing a site at the Rutgers Center to demonstrate the HDR process in continuous operation to investors. This is critical to DWUSA's efforts to attract the investment funding that is needed to construct and render the Winslow Site and the Sparta Facility operational.

The Winslow Site

32. Immediately following execution of the Resolution, DWUSA created a site plan for a commercial synfuel feedstock facility to consist of 1,600 synfuel production units to be constructed on a 62 acre site in Winslow Township. It created architectural drawings and submitted them to the

local township Soil Conservation and Construction offices, and developed a website to market its RFA process.

33. DWUSA agreed to pay Behrens $29,000 to build the first five units, intended primarily to demonstrate the Aurora process to potential investors and licensees. DWUSA paid Behrens as agreed.

34. Rigolizzo and Behrens spoke almost daily during this initial phase of development, and Behrens consistently claimed to be purchasing all the materials that he would need to complete the units, including pumps, wind turbines, steel tubing, solar panels and, critically, the LVKN Nozzles. Behrens sent DWUSA photos of a "pyramid" design unit that he claimed to be building in a warehouse in Pennsylvania, along with "purchased" pumps and an LVKN Nozzle in use. In February 2014, Behrens requested that DWUSA buy heavier duty pumps that could withstand more force during cavitation. DWUSA paid Behrens an additional $7,000, as requested.

35. In March 2014, DWUSA began preparatory construction at the Winslow Site. Later that month, Rigolizzo requested that Behrens bring the equipment that he claimed to have been amassing in his Pennsylvania warehouse to the Winslow Site, so that the HDR process could be demonstrated to investors. Behrens told Rigolizzo that the money DWUSA had given him was "gone," and that he did not even have gas money to come to the site. All he had was enough steel tubing to build a partial unit.

36. Since Behrens misappropriated the funds paid by DWUSA to build the first five units, DWUSA has focused on developing structures to best house the algae growing tanks for the System, with the goal being to provide optimal growing conditions for the algae in a cost-effective "temporary" structure that needed no formal permitting under New Jersey's "Right to Farm Act" but

could withstand severe weather conditions like high winds and snow.

37. Several of Behrens' conceptual designs, including his initial pyramid design, worked in theory only. Upon completion, DWUSA found that they could not withstand the severe weather conditions they were represented by Behrens to withstand. Through considerable trial and error, DWUSA was eventually able to develop a faceted design and materials that provide optimal growing conditions for the algae and can withstand high winds and snow.

38. When completed, the 63 acre Winslow Site will contain 1,600 units, with each unit containing three 2,000 gallon algae producing tanks. The automatically harvested oil from each tank flows into holding tanks 24 hours a day, seven days a week. The facility will operate seven days per week, 365 days per year and, combined, the units will produce 26,000,000+ gallons of synfuel annually.

The Sparta Facility

39. Throughout the South and in remote locations across the United States, many towns use settling ponds or lagoons to collect municipal sewage as part of their waste water treatment process. In most cases, duckweed and algae grow and collect in these ponds, which poses a large problem for water treatment facilities that require expensive control systems. In addition to the sewage, duckweed and algae growth in the settling lagoons provide an ideal biomass source for the HDR process utilizing the Alchemy System.

40. After significant marketing efforts, discussions and negotiations, which took place over a period of several months and in which Behrens participated, on August 4, 2014, DWUSA entered into a the "LVKN Synfuel Production System Contract" with the City of Sparta, Georgia, to install and operate its premiere "Alchemy" Synfuel Production Facility at the Sparta Waste Water

Treatment Facility. (the "Sparta Contract"). A true and correct copy of the Sparta Contract is attached hereto as Exhibit C.

41. The 20 acre site will produce upwards of 16,000 gallons of a clean petroleum oil substitute daily, or approximately 6,000,000 gallons annually. The settling ponds of the Sparta, Georgia Water treatment facility have a biomass concentration to an average of 30,000 parts per million due to the heavy duckweed growth blended with the human waste.

42. One third of the revenue generated from the Sparta Facility will be paid to the City of Sparta, which projects to nearly $4,000,000 in revenue per year for Sparta, a valuable benefit for the small city. By offering this revenue share, DWUSA helps the local community and can create a showpiece for all communities that invite future Alchemy development opportunities. The Mayor of Sparta, with whom DWUSA has developed a close working relationship, is a member of the Tri-State Water Commission (Florida, Alabama and Georgia), and has used his position to present the Alchemy System to cities and towns with like water treatment facilities that suffer from the same algal and duckweed blooms that Sparta does.

43. Two thirds of the revenue from the Sparta Facility will belong to DWUSA. After operating and maintenance costs, that projects to approximately $7,000,000 in net income annually. Income from the Sparta Facility will be critical to DWUSA's continuing research and development efforts, and its development of further projects.

The Rutgers Site

44. In November 2014, Behrens informed Rigolizzo and Longo that he had succeeded in convincing Rutgers to allow DWUSA to build a demonstration unit at the Rutgers Center.

45. In January 2015, DWUSA began to lay out the demonstration site for the Rutgers Center, and to push for funding.

46. It was around this time that Rigolizzo was introduced to Kearney, who told Rigolizzo that he had many contacts in the investing community and could assist DWUSA attract funding for its projects.

47. As a result, on February 25, 2015, Duckweed entered into a Commission Agreement with Kearney. A true and correct copy is attached hereto as Exhibit D.

48. Pursuant to the Commission Agreement, Kearney agreed to use his "best efforts" to solicit projects and investors for the development of DWUSA's patented systems, and would be paid a commission equal to 5% of the investment capital that he was able to raise for DWUSA, and a residual royalty per gallon of synfuel produced if he secured a project and/or investor and the resultant project was successfully commissioned. The Commission Agreement strictly limited the use that Kearney could make of confidential information with which DWUSA would supply him.

49. Kearney set up a meeting between DWUSA and Abraham, whom he introduced as a funding source. In March, 2015, Abraham (through his company EPA Marketing Management, Inc.) loaned DWUSA $45,500 to "construct[] a prototype of the Linear Venturi Kinetic Nozzle Synfuel Production System" for the Rutgers site. Rigolizzo, Longo and Behrens each guaranteed repayment of the loan in their individual capacities. True and correct copies of the Loan Agreement and Promissory Note are attached hereto as Exhibit E. A true and correct copy of Behrens' guarantee is attached hereto as Exhibit F.

50. DWUSA and Abraham anticipated entering into an agreement regarding a right of refusal to fund DWUSA's "Synfuel Production Facility" in Sparta, Georgia. *See* Exhibit E.

Abraham has forfeited any such rights due as a result of his unlawful conduct as set forth below.

Defendants Conspire to Infringe the 494 Patent and Steal DWUSA's Opportunities

51. With funding for the Rutgers site in place, DWUSA went to work immediately at the Rutgers site. The greenhouse structures did not take long to erect (the research and development already having been done at the Winslow Site), but DWUSA had to adjust the location of the structures and regrade and infill the site to account for a more than 24 inch slope on the southerly and eastern sides of the site, which took time. DWUSA sourced and purchased tanks for growing the algae, installed cabling to stabilize the framework of the greenhouses and then anchored the system to the difficult granite site, which entailed installing 1 inch concrete pins at every exterior corner and 3/4 inch pins at every interior hub that had to be drilled into the granite. Then the specialized fabric skin was installed over the structures and, by June 17, 2015, the system was installed and ready for operation. All that was needed was for Behrens to deliver the LVKN pump/nozzle assemblies and the "artificial intelligence" to operate the system.

52. By that time, DWUSA had paid Behrens more than $80,000 to source, manufacture and deliver the LVKN pump and nozzle assemblies and artificial intelligence. While Behrens had on occasion brought this equipment to the Winslow and Rutgers sites to demonstrate the process for potential DWUSA investors, he always took them with him afterwards, claiming that he needed to make adjustments and/or refinements.

53. On June 18, 2015 – i.e., the day after construction at the site was completed and the demonstration units were ready to operate -- Rigolizzo received an email from Behrens in which he wrote: "My son needs help. I need $3500. Do we have it?" DWUSA had exhausted the funds from Abraham, but Rigolizzo emailed back that he would try to find the money somewhere.

54. The next day, June 19, 2015, Rigolizzo and Longo each received an email from Behrens in which he stated that he was "withdrawing from Duckweed" and "nullifying" DWUSA's exclusive license. *See* Exhibit G hereto. This was not the first time that Behrens had threatened to nullify DWUSA's license when Rigolizzo did not respond immediately to demands by Behrens for money.

55. However, Behrens went on to claim that his company, BEAR (not DWUSA), had made the agreement with Rutgers to demonstrate *its* "patented technologies" – i.e., the technologies for which DWUSA has an exclusive license to commercialize – to "the world," and that *he* had built the structure now situate at the Rutgers site. See Exhibit G.

56. Simply stated, Behrens informed Rigolizzo and Longo that he and BEAR were commandeering the Rutgers site to market "to the world" the technologies and processes for which DWUSA has the exclusive license.

57. Since Behrens' email, Kearney, Abraham and Behrens, acting in concert, have engaged in a systematic effort to infringe the Patent, disparage DWUSA, steal its opportunities and investment sources, and put it out of business.

58. Among other things, Behrens and Kearney (acting on his own behalf and on behalf of Abraham), have each communicated on multiple occasions by email and telephone with DWUSA investors James McMonagle and Frank Marx, in which, among other things, Kearney (for himself and Abraham) and Behrens: (i) disparage Rigolizzo, calling him a liar and a thief, (ii) make clear that, together with Abraham, they will install the LVKN pump and nozzle assemblies and artificial intelligence – which Behrens has withheld and refused to deliver to DWUSA – in order to make the Rutgers site operational and present it "to the world" as a BEAR project; (iii) make clear that,

together with Abraham, they intend to pursue the Sparta, Georgia opportunity through BEAR once the Rutgers site is operational; and (iv) solicit DWUSA's investors away from DWUSA.

59. On September 4, 2015, Rigolizzo received a call from Abraham, who bragged that the tanks at the Rutgers site were filled and growing algae, that the LVKN pump and nozzle assemblies were about to be installed, and that the demonstration units would then be fully operational.

60. On September 7, 2015, Behrens posted on the BEAR website that:

> We had a detailed analysis made of our product. Independent scientists operated our system and made samples which were analyzed. It is world-changing. It is mostly paraffin, easily refined into gasoline, and some traces of gasoline, diesel oil and jet fuel. All we used was our H-D-R System and some pond scum. We virtually turned lead into gold- for $0.22 per gallon. You can see the data yourself on this FB page.

61. In addition, during the last quarter of 2014, DWUSA made a concerted effort to contact and solicit biodiesel companies to retrofit their systems with the LVKN pump and nozzle setups. The tax incentives and subsidies that had been available to such companies were drying up, and DWUSA presented them with a way to stay in business. The subsidies have not been renewed by Congress, and since then most of the companies that DWUSA contacted have closed up and been auctioned off.

62. Every time DWUSA was asked technical questions by the biodiesel companies, it referred them to Behrens. After Behrens announced his withdrawal from DWUSA, and purported to "nullify" its license, he sent DWUSA's investors pictures of a biodiesel location where he and BEAR had installed an LVKN pump and nozzle to process 16,000 gallons of biodiesel fuel a week, and bragged to the investors that this "could have been them."

COUNT I - PATENT INFRINGEMENT
(DWUSA V. ALL DEFENDANTS)

63. Paragraphs 1 through 62 are incorporated by reference as if fully set forth herein.

64. Behrens and BEAR have directly infringed and continue to infringe the Patent, literally and/or under the doctrine of equivalents, by developing, marketing, licensing and/or offering to license the patented technologies and processes covered in the 494 Patent for which DWUSA holds the exclusive license.

65. Their infringement of the 494 Patent has been and continues to be intentional, willful, and without regard to DWUSA's rights.

66. Kearney and Abraham have indirectly infringed and continue to infringe the 494 Patent, by inducing, encouraging and/or contributing to Behrens and Bears's direct infringement of the Patent.

67. Kearney and Abraham each knew of and intended to induce Behrens and Bears's infringement of the 494 Patent. DWUSA's exclusive license is well known to each of them, yet each has induced, encouraged and/or contributed to Behrens and BEAR's infringement.

68. Kearney and Abraham's indirect infringement of the 494 Patent has been and continues to be intentional, willful, and without regard to DWUSA's rights.

69. Defendants' unlawful conduct, as aforesaid, was willful, wanton and outrageous.

70. DWUSA will suffer and is suffering irreparable harm from defendants' infringement of the 494 Patent. DWUSA has no adequate remedy at law and is entitled to a preliminary and permanent injunction against defendants' continuing infringement of the 494 Patent. Unless enjoined, defendants will continue their infringing conduct.

71. DWUSA has sustained and will continue to sustain damages as a direct and proximate result of defendants' infringement of the 494 Patent.

WHEREFORE, DWUSA prays for relief as set forth below.

COUNT II - BREACH OF LICENSE AGREEMENT
(DWUSA V. BEHRENS)

72. Paragraphs 1 through 71 are incorporated by reference as if fully set forth herein.

73. The Resolution is a valid and enforceable contract between Behrens and USA pursuant to which DWUSA has an exclusive license to develop, market and license commercial synfuel feedstock facilities using the technology and systems covered by the 494 Patent.

74. Behrens has breached the Resolution and the license agreement by, among other things, purporting to nullify DWUSA's license and engaging in his own efforts to develop, market and license the commercial synfuel feedstock facilities using the technology and systems covered by the 494 Patent and license agreement.

75. DWUSA has performed all of its obligations under the Resolution and license agreement.

76. Behrens' unlawful conduct, as aforesaid, was willful, wanton and outrageous.

77. DWUSA will suffer and is suffering irreparable harm from Behrens' breach of the Resolution and license agreement. DWUSA has no adequate remedy at law and is entitled to a preliminary and permanent injunction against Behrens' continuing breach. Unless enjoined, Behrens' will continue his unlawful conduct.

78. DWUSA has sustained and will continue to sustain damages as a direct and proximate result of Behrens' breaches of the license agreement.

WHEREFORE, DWUSA prays for relief as set forth below.

COUNT III-TORTIOUS INTERFERENCE WITH EXISTING CONTRACT (DWUSA V. KEARNEY AND ABRAHAM)

79. Paragraphs 1 through 78 are incorporated by reference as if fully set forth herein.

80. Kearney and Abraham have intentionally and improperly interfered with Behrens' performance of the license agreement by inducing him to breach the contract.

81. Kearney and Abraham's interference with Behrens' performance of the license agreement was improper and without privilege to do so.

82. Defendants' unlawful conduct, as aforesaid, was willful, wanton and outrageous.

83. DWUSA will suffer and is suffering irreparable harm from Kearney and Abraham's unlawful conduct. DWUSA has no adequate remedy at law and is entitled to a preliminary and permanent injunction against defendants' continuing tortious interference. Unless enjoined, Kearney and Abraham will continue their unlawful conduct.

84. DWUSA has sustained and will continue to sustain damages as a direct and proximate result of Kearney and Abraham's tortious interference with Behrens' performance of the license agreement.

WHEREFORE, DWUSA prays for relief as set forth below.

COUNT IV-AIDING AND ABETTING BREACH OF LICENSE AGREEMENT (DWUSA V. KEARNEY AND ABRAHAM)

85. Paragraphs 1 through 84 are incorporated by reference as if fully set forth herein.

86. At all times material hereto, Kearney and Abraham were well aware of DWUSA's rights under the Resolution and license agreement.

87. Kearney and Abraham aided and abetted Behrens' breaches of the Resolution and license agreement in that they gave Behrens substantial assistance and/or encouragement to breach same.

88. Defendants' unlawful conduct, as aforesaid, was willful, wanton and outrageous.

89. DWUSA will suffer and is suffering irreparable harm as a result of defendants' unlawful conduct. DWUSA has no adequate remedy at law and is entitled to a preliminary and permanent injunction against defendants' continuing unlawful activity. Unless enjoined, Kearney and Abraham will continue with their unlawful conduct.

90. DWUSA has sustained and will continue to sustain damages as a direct and proximate result of Kearney and Abraham's unlawful conduct.

WHEREFORE, DWUSA prays for relief as set forth below.

COUNT V-CIVIL CONSPIRACY TO BREACH THE LICENSE AGREEMENT (DWUSA V. ALL DEFENDANTS)

91. Paragraphs 1 through 90 are incorporated by reference as if fully set forth herein.

92. Behrens, BEAR, Kearney and Abraham combined and agreed, with malice and intent, and without justification, to breach the Resolution and license agreement.

93. To accomplish this, Behrens, BEAR, Kearney and Abraham, acting in concert, each took overt action designed to cause Behrens to nullify the license agreement, and together have pursued efforts to develop, market and license the commercial synfuel feedstock facilities using the technology and systems covered by the 494 Patent and the Resolution and license agreement.

94. Defendants' conduct, as aforesaid, was willful, wanton and outrageous.

95. DWUSA will suffer and is suffering irreparable harm as a result of defendants' unlawful conduct. DWUSA has no adequate remedy at law and is entitled to a preliminary and permanent injunction against defendants' continuing unlawful activity. Unless enjoined, defendants will continue their unlawful conduct.

96. DWUSA has sustained and will continue to sustain damages as a direct and proximate result of defendants' unlawful conduct.

WHEREFORE, DWUSA prays for relief as set forth below.

COUNT VI-BREACH OF FIDUCIARY DUTY
(DWUSA V. BEHRENS)

97. Paragraphs 1 through 96 are incorporated by reference as if fully set forth herein.

98. Behrens, as an officer of DWUSA, and one third shareholder with a 50% voting interest, owes DWUSA fiduciary duties.

99. Behrens has breached his fiduciary duties by, among other things, purporting to nullify DWUSA's license, engaging in his own efforts to develop, market and license the commercial synfuel feedstock facilities using the technology and systems covered by the 494 Patent and license agreement; steal DWUSA's corporate opportunities and investment sources; and put DWUSA out of business.

100. Behrens' unlawful conduct, as aforesaid, was willful, wanton and outrageous.

101. DWUSA will suffer and is suffering irreparable harm as a result of Behrens' unlawful conduct. DWUSA has no adequate remedy at law and is entitled to a preliminary and permanent injunction against Behrens' continuing unlawful activity. Unless enjoined, Behrens will continue his unlawful conduct.

102. DWUSA has sustained and will continue to sustain damages as a direct and proximate result of Behrens' unlawful conduct.

WHEREFORE, DWUSA prays for relief as set forth below.

COUNT VII-AIDING AND ABETTING BREACH OF FIDUCIARY DUTY (DWUSA V. KEARNEY AND ABRAHAM)

103. Paragraphs 1 through 102 are incorporated by reference as if fully set forth herein.

104. At all times material hereto, Kearney and Abraham were aware of DWUSA's rights under the Resolution and license agreement, and of the fiduciary duties that Behrens owed to DWUSA.

105. Kearney and Abraham aided and abetted Behrens' breaches of fiduciary duty in that they gave Behrens substantial assistance and/or encouragement to do so.

106. Defendants' conduct, as aforesaid, was willful, wanton and outrageous.

107. DWUSA will suffer and is suffering irreparable harm as a result of defendants' unlawful conduct. DWUSA has no adequate remedy at law and is entitled to a preliminary and permanent injunction against defendants' continuing unlawful activity. Unless enjoined, Kearney and Abraham will continue their unlawful conduct.

108. DWUSA has sustained and will continue to sustain damages as a direct and proximate result of Kearney and Abraham's unlawful conduct.

WHEREFORE, DWUSA prays for relief as set forth below.

COUNT VIII-CIVIL CONSPIRACY TO BREACH THE LICENSE AGREEMENT (DWUSA V. ALL DEFENDANTS)

109. Paragraphs 1 through 108 are incorporated by reference as if fully set forth herein.

110. Behrens, BEAR, Kearney and Abraham combined and agreed, with malice and intent, and without justification, to breach the fiduciary duties owed by Behrens to DWUSA.

111. To accomplish this, Behrens, BEAR, Kearney and Abraham, acting in concert, each took overt action designed to result in causing Behrens to breach his fiduciary duties to DWUSA, as aforesaid.

112. Defendants' unlawful conduct, as aforesaid, was willful, wanton and outrageous.

113. DWUSA will suffer and is suffering irreparable harm as a result of defendants' unlawful conduct. DWUSA has no adequate remedy at law and is entitled to a preliminary and permanent injunction against defendants' continuing unlawful activity. Unless enjoined, defendants will continue their unlawful conduct.

114. DWUSA has sustained and will continue to sustain damages as a direct and proximate result of defendants' unlawful conduct.

WHEREFORE, DWUSA prays for relief as set forth below.

COUNT IX-PROMISSORY ESTOPPEL
(DWUSA V. BEHRENS)

115. Paragraphs 1 through 114 are incorporated by reference as if fully set forth herein.

116. Behrens made a clear and definite promise to give DWUSA an exclusive license to develop, market, and license commercial synfuel feedstock facilities utilizing the system for producing hydrocarbons from wind energy, water and algae that is claimed in the 494 Patent.

117. Behrens made this promise with the expectation that DWUSA would rely upon it.

118. DWUSA reasonably and justifiably relied upon Behrens' promise in devoting substantial research, time, effort and expense to develop the technologies and processes covered in

the 494 Patent.

119. Behrens' unlawful conduct, as aforesaid, is depriving DWUSA of its lawful opportunity to commercialize the technologies and processes covered by 494 Patent as promised by Behrens.

120. Behrens' unlawful conduct, as aforesaid, was willful, wanton and outrageous.

121. DWUSA will suffer and is suffering irreparable harm as a result of Behrens' unlawful conduct. DWUSA has no adequate remedy at law and is entitled to a preliminary and permanent injunction against Behrens' continuing unlawful activity. Unless enjoined, Behrens will continue his unlawful conduct.

122. DWUSA has sustained and will continue to sustain damages as a direct and proximate result of Behrens' unlawful conduct.

WHEREFORE, DWUSA prays for relief as set forth below.

PRAYER FOR RELIEF

Wherefore, DWUSA prays for judgment in favor, and against Behrens, BEAR, Kearney and Abraham, jointly and severally, together with:

a) Compensatory damages according to proof;

b) Treble damages for willful and deliberate infringement pursuant to 35 U.S.C. Section 284;

b) Punitive damages;

c) Attorneys fees and costs of suit;

d) preliminary and permanent injunctive relief, including:

- enjoining defendants from infringing the 494 Patent;

- enjoining defendants from conducting any synfuel production at the Rutgers site utilizing the system for producing hydrocarbons from wind energy, water and algae that is claimed in the 494 Patent;
- enjoining defendants from any contact with the City of Sparta Georgia, or any of it representatives, concerning synfuel production utilizing the system for producing hydrocarbons from wind energy, water and algae that is claimed in the 494 Patent;
- enjoining defendants from contacting DWUSA's investors; and
- enjoining Behrens to deliver the LVKN pump/nozzle assemblies and artificial intelligence to DWUSA; and

e) Such other legal or equitable relief to which DWUSA is entitled.

BRAVERMAN KASKEY, P.C.

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Attorneys for Plaintiff Duckweed USA, Inc.

Dated: September 29, 2015

EXHIBIT

A

US007750494B1

(12) **United States Patent**
Behrens et al.

(10) **Patent No.: US 7,750,494 B1**
(45) **Date of Patent: *Jul. 6, 2010**

(54) **SYSTEMS AND VESSELS FOR PRODUCING HYDROCARBONS AND/OR WATER, AND METHODS FOR SAME**

(75) Inventors: **Rudolph Behrens**, 254 Liberty Ct., Collegeville, PA (US) 19426; **Todd Behrens**, Collegeville, PA (US); **Courtney Behrens**, Collegeville, PA (US); **Derek Behrens**, Collegeville, PA (US)

(73) Assignee: **Rudolph Behrens**, Collegeville, PA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **11/998,912**

(22) Filed: **Dec. 3, 2007**

Related U.S. Application Data

(60) Provisional application No. 60/874,504, filed on Dec. 13, 2006.

(51) **Int. Cl.**
F03D 9/00 (2006.01)

(52) **U.S. Cl.** **290/55**; 114/264

(58) **Field of Classification Search** 114/264, 114/265; 290/55

See application file for complete search history.

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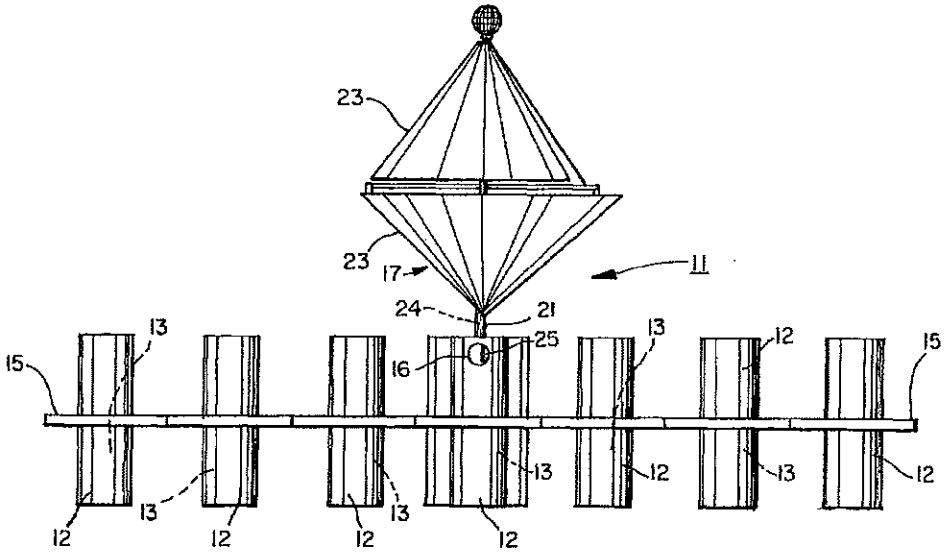
Primary Examiner—Stephen Avila
(74) *Attorney, Agent, or Firm*—John F. A. Earley, III; Frank J. Bonini, Jr.; Harding, Earley, Follmer & Frailey

(57) **ABSTRACT**

Systems and methods for producing hydrocarbons from wind energy, water, and air comprising a power system, wind turbine, and electrical generator; the system further comprises a water purifier comprising a conduit and vacuum device for flash distillation; the system further includes a hydrocarbon processor, which comprises a carbon dioxide interface, and electrolyzer, a reverse water gas shift reactor, and an ethanation reactor; alternatively the hydrocarbon processor may include a cyanobacteria cultivator a solution optimizer and a catalyzer; also included is a method for producing purified water using vegetation in a floatable craft; also disclosed is a synthetic fuel process consisting of a translucent closed tank for producing algae and a protein separator for dewatering algae; methods relating to production and drawing of algae to produce methane and other hydrocarbon promoters; also disclosed is a energy producing rainkine-cycle engine device for storing concentrated solar energy.

29 Claims, 12 Drawing Sheets



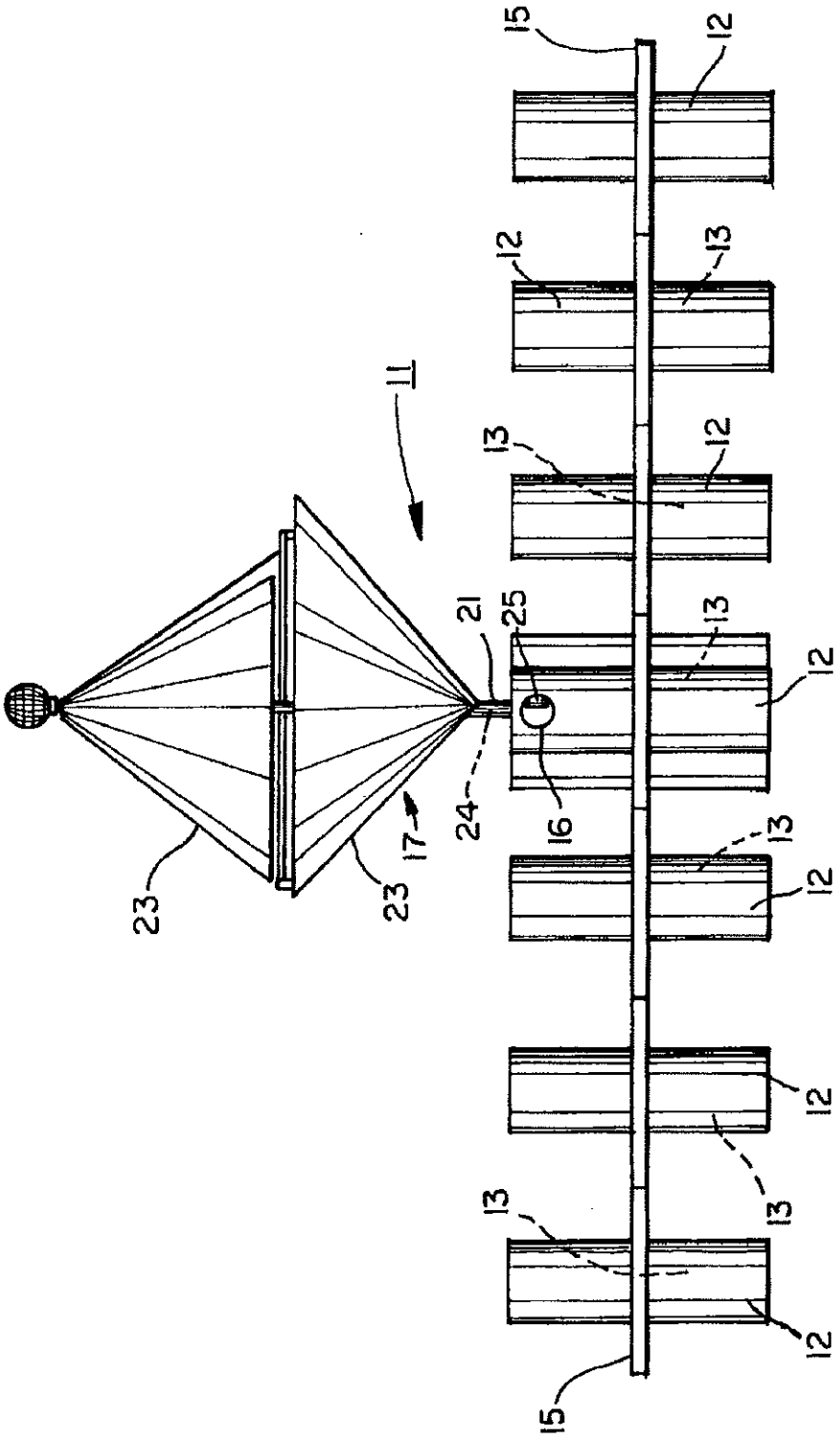


FIG. 1

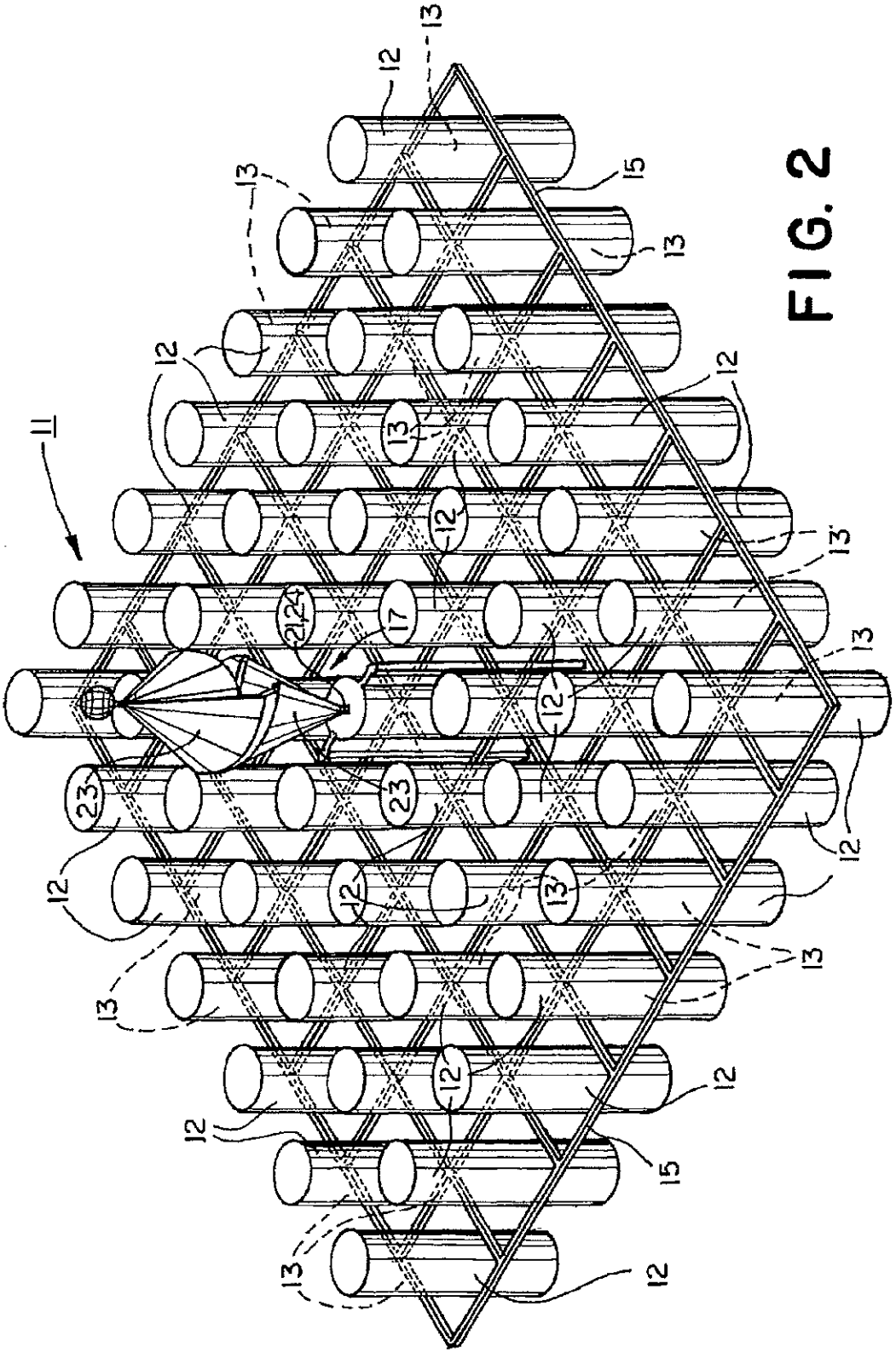


FIG. 2

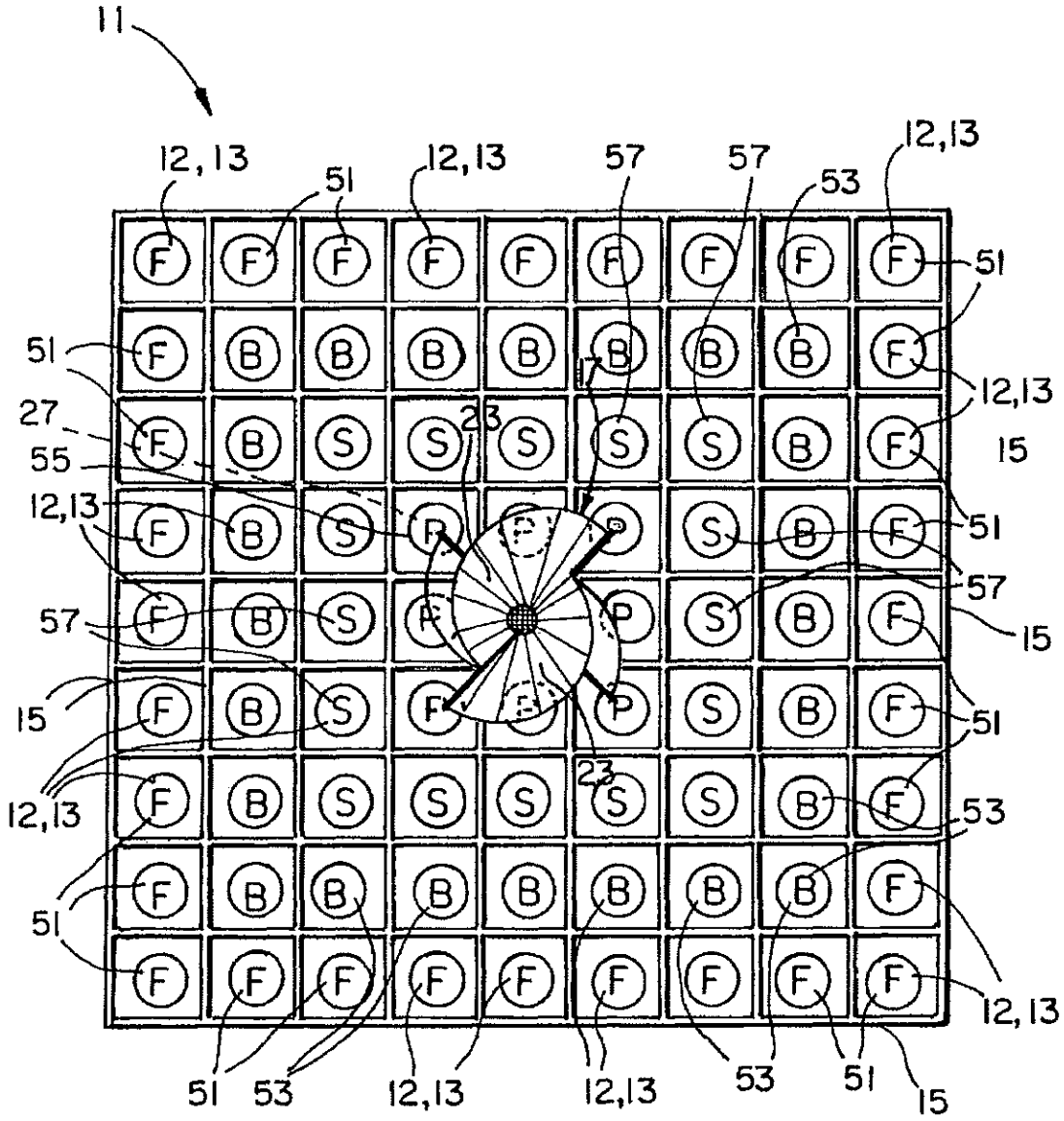

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FIG. 3

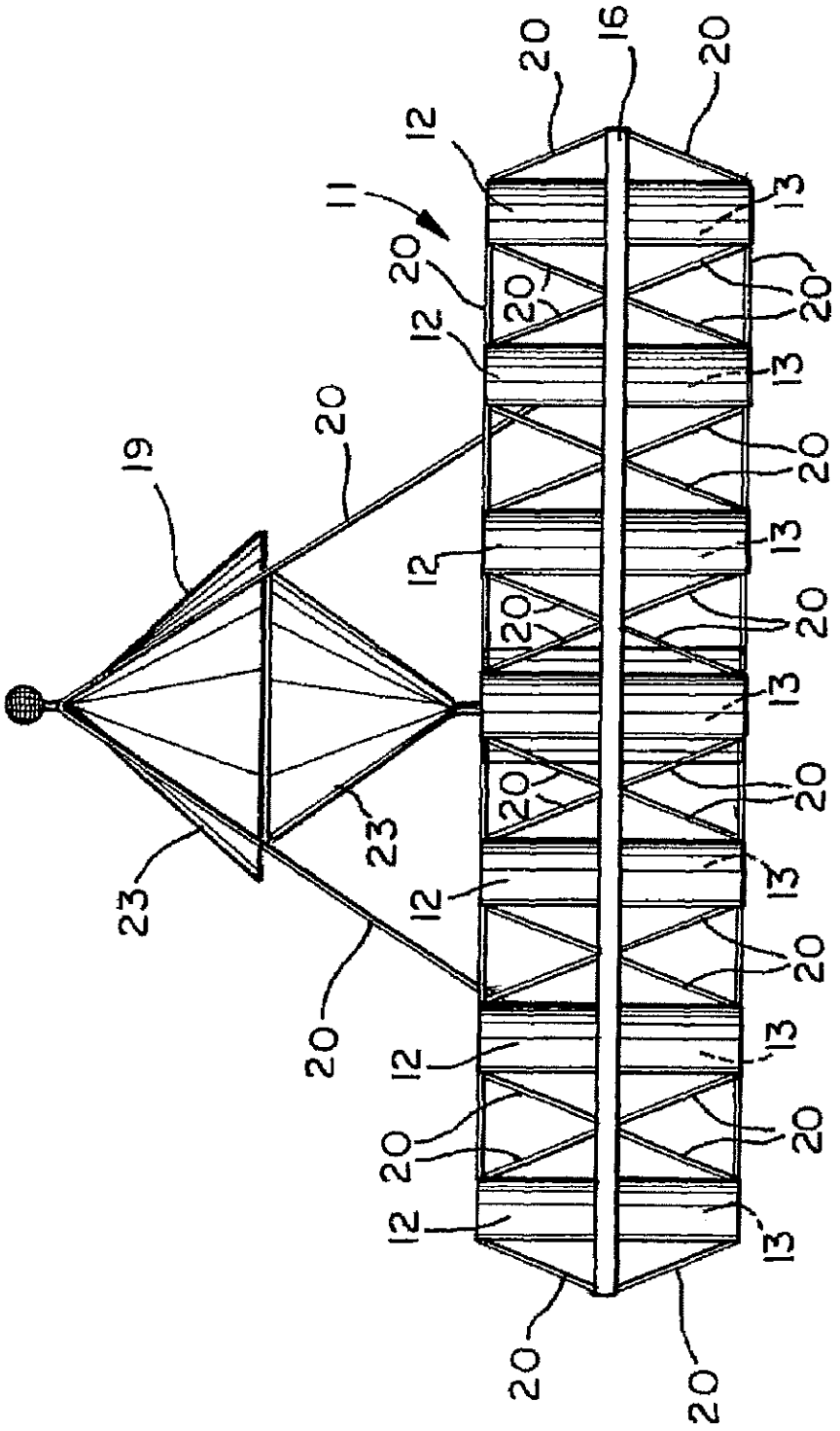
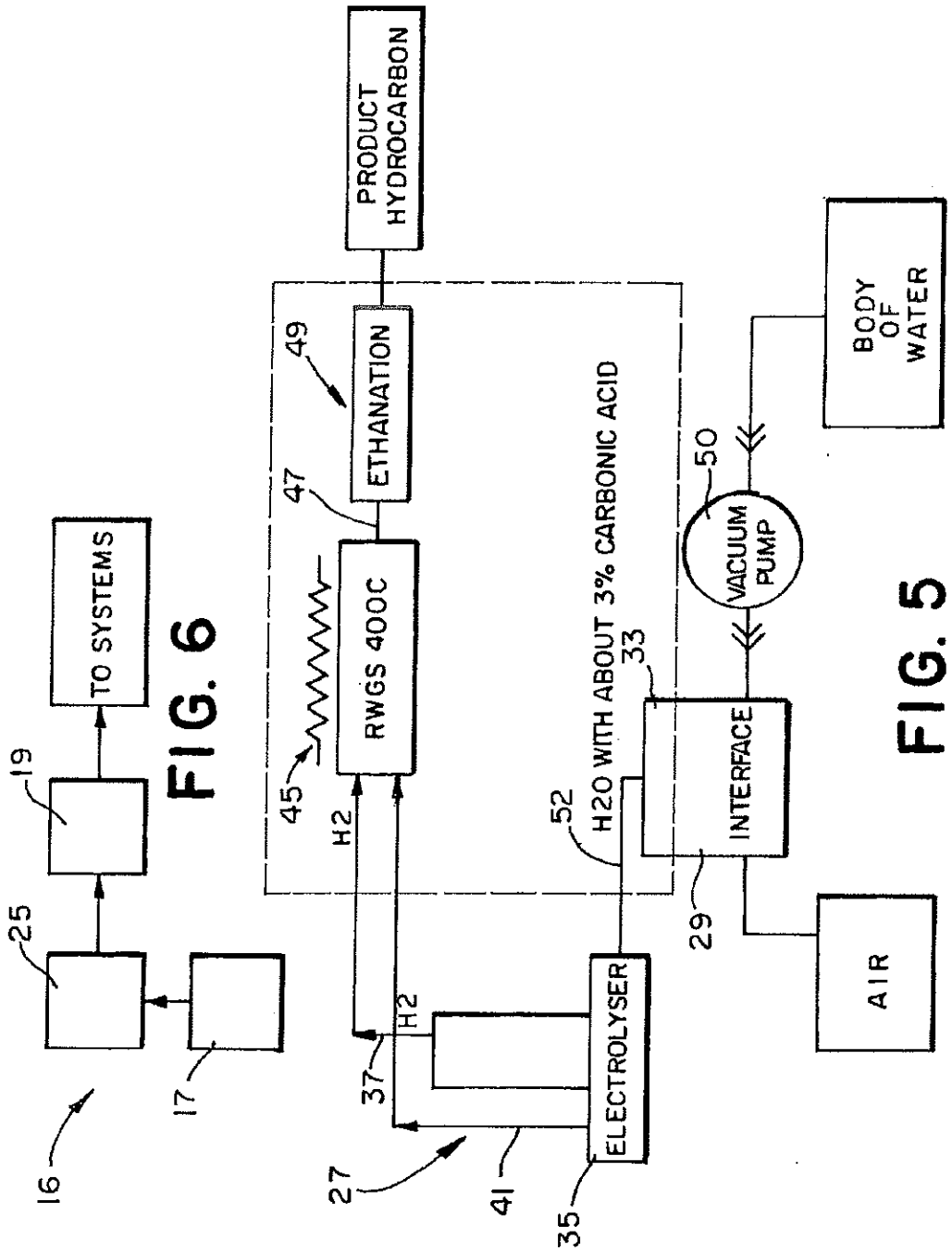


FIG. 4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H2 WITH ABOUT 3% CARBONIC ACID
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FIG. 5

FIG. 6

FIG. 7

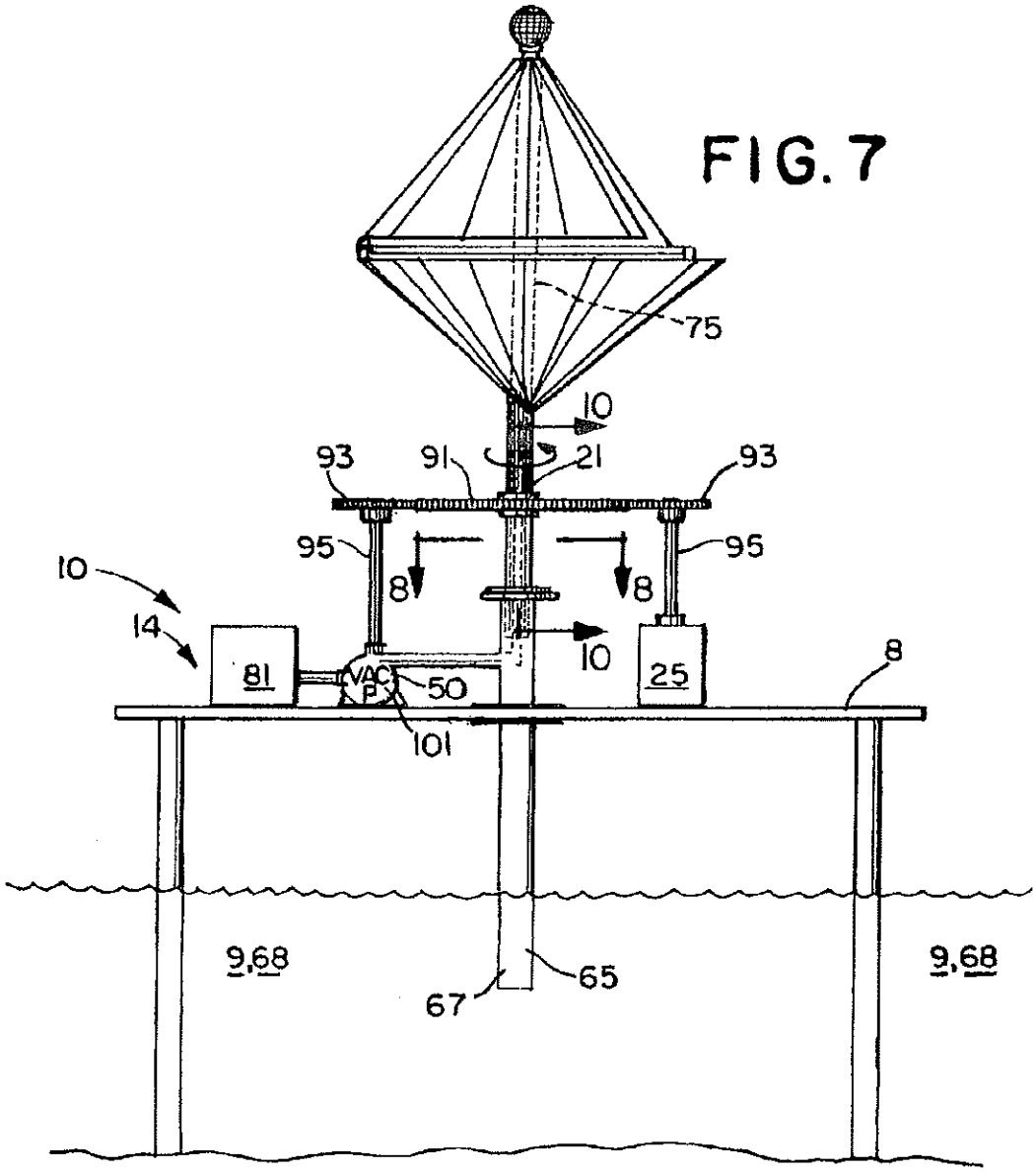
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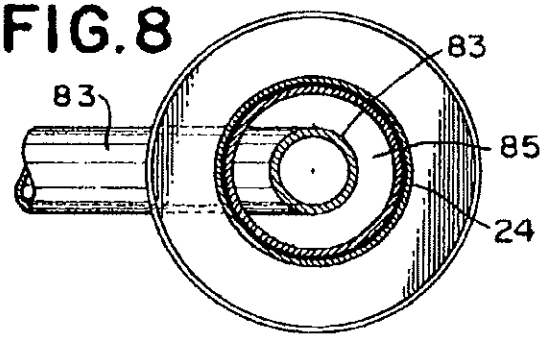
FIG. 8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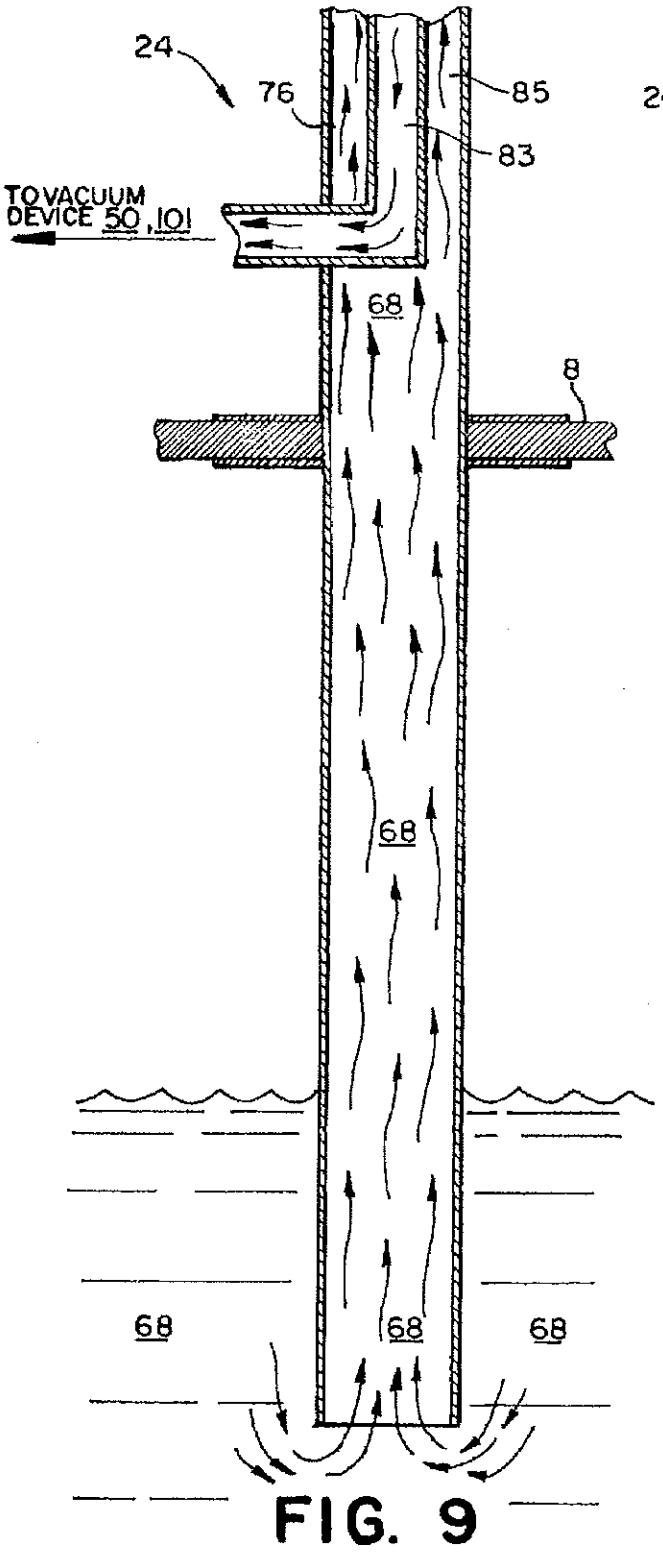
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FIG. 9

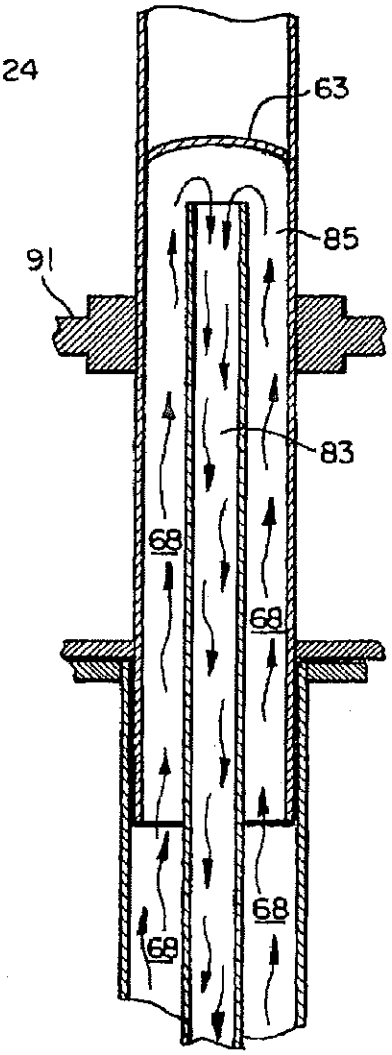
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FIG. 10

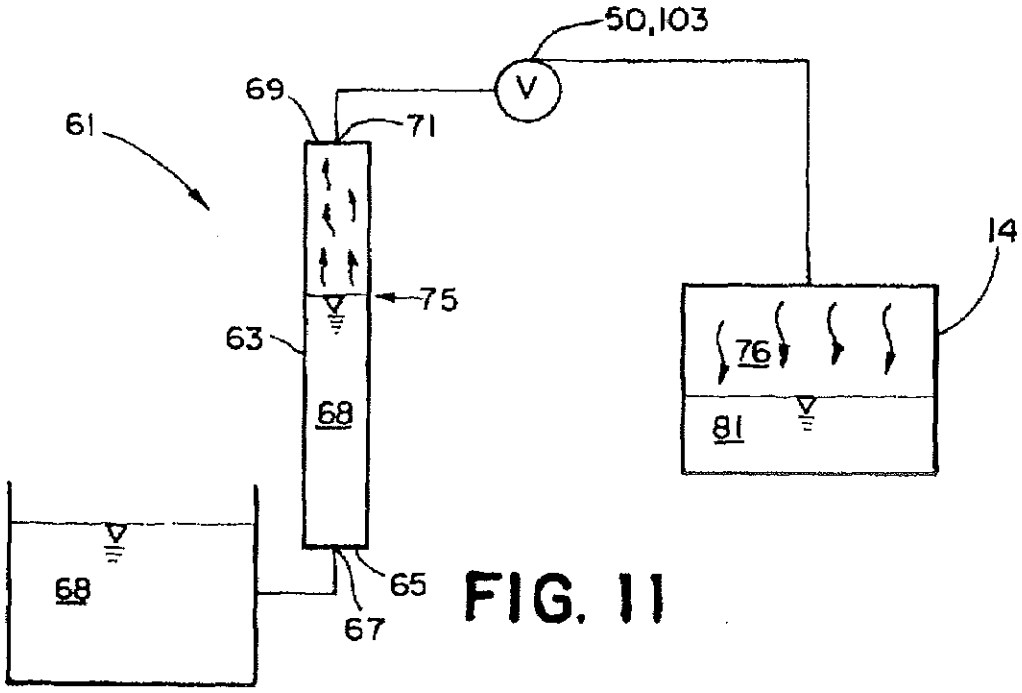
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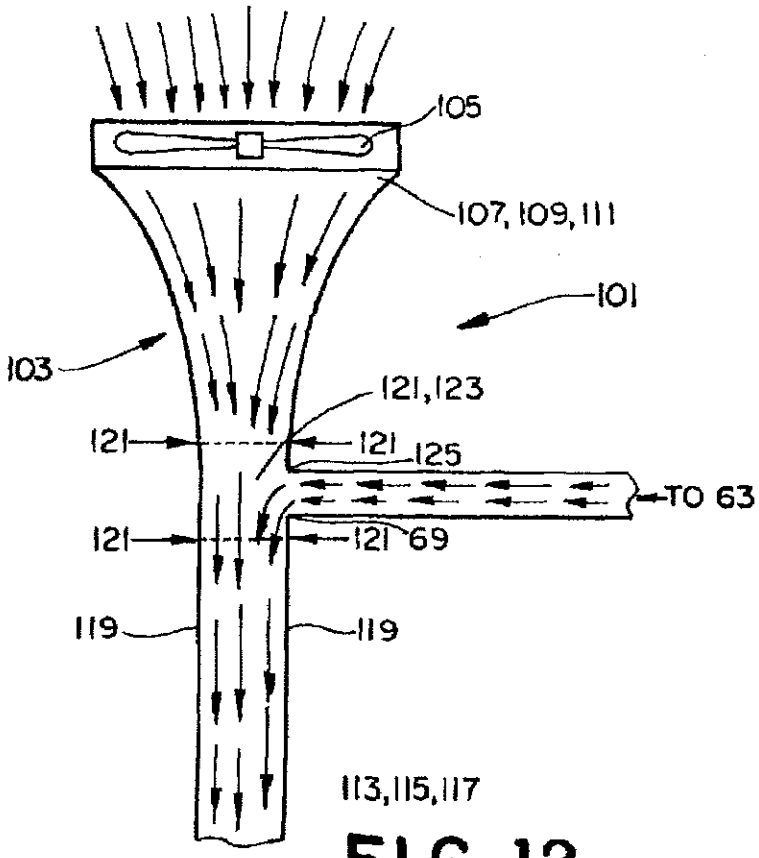
FIG. 11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113,115,117

FIG. 12

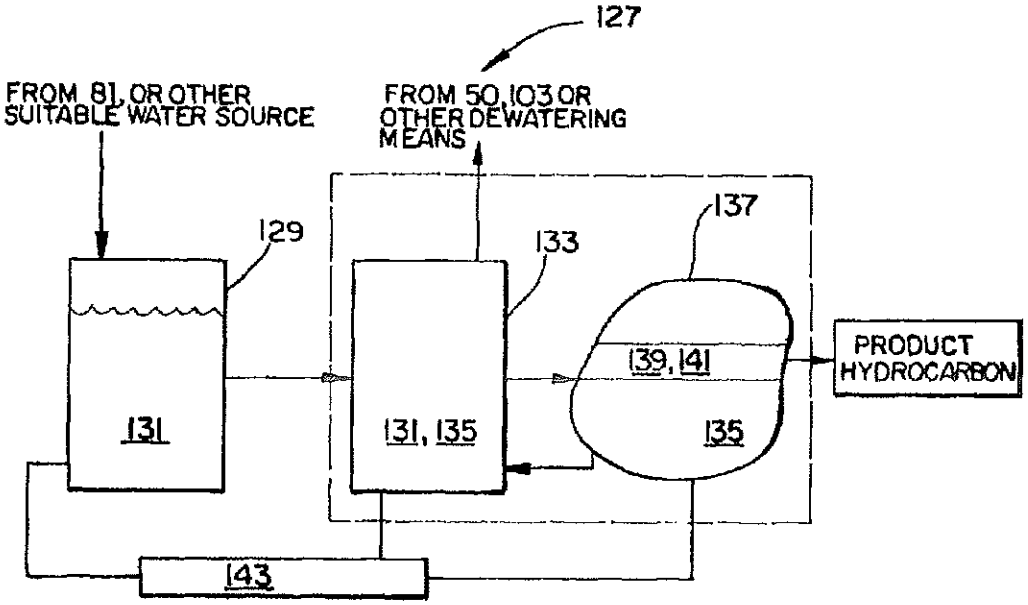
127
FROM 81, OR OTHER SUITABLE WATER SOURCE
FROM 50, 103 OR OTHER DEWATERING MEANS
129
133
137
131
131, 135
139, 141
135
PRODUCT HYDROCARBON
143

FIG. 13

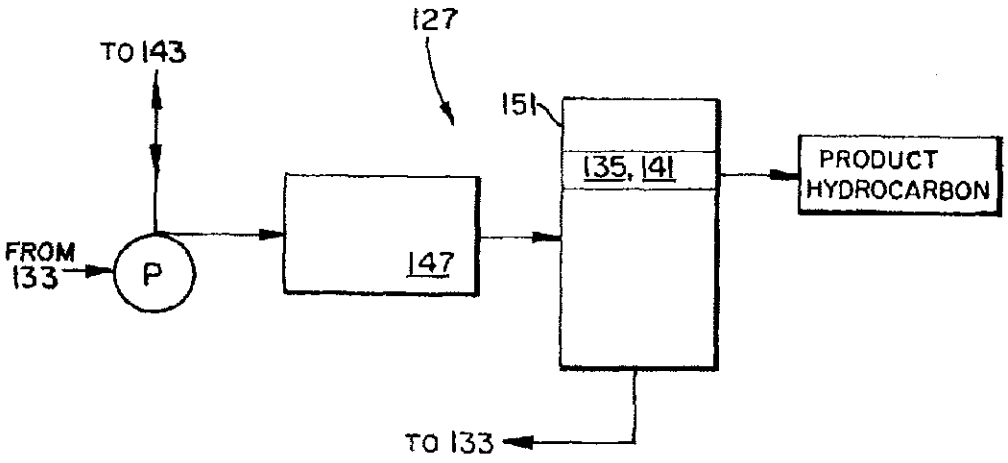
127
TO 143
151
135, 141
PRODUCT HYDROCARBON
FROM 133
P
147
TO 133

FIG. 14

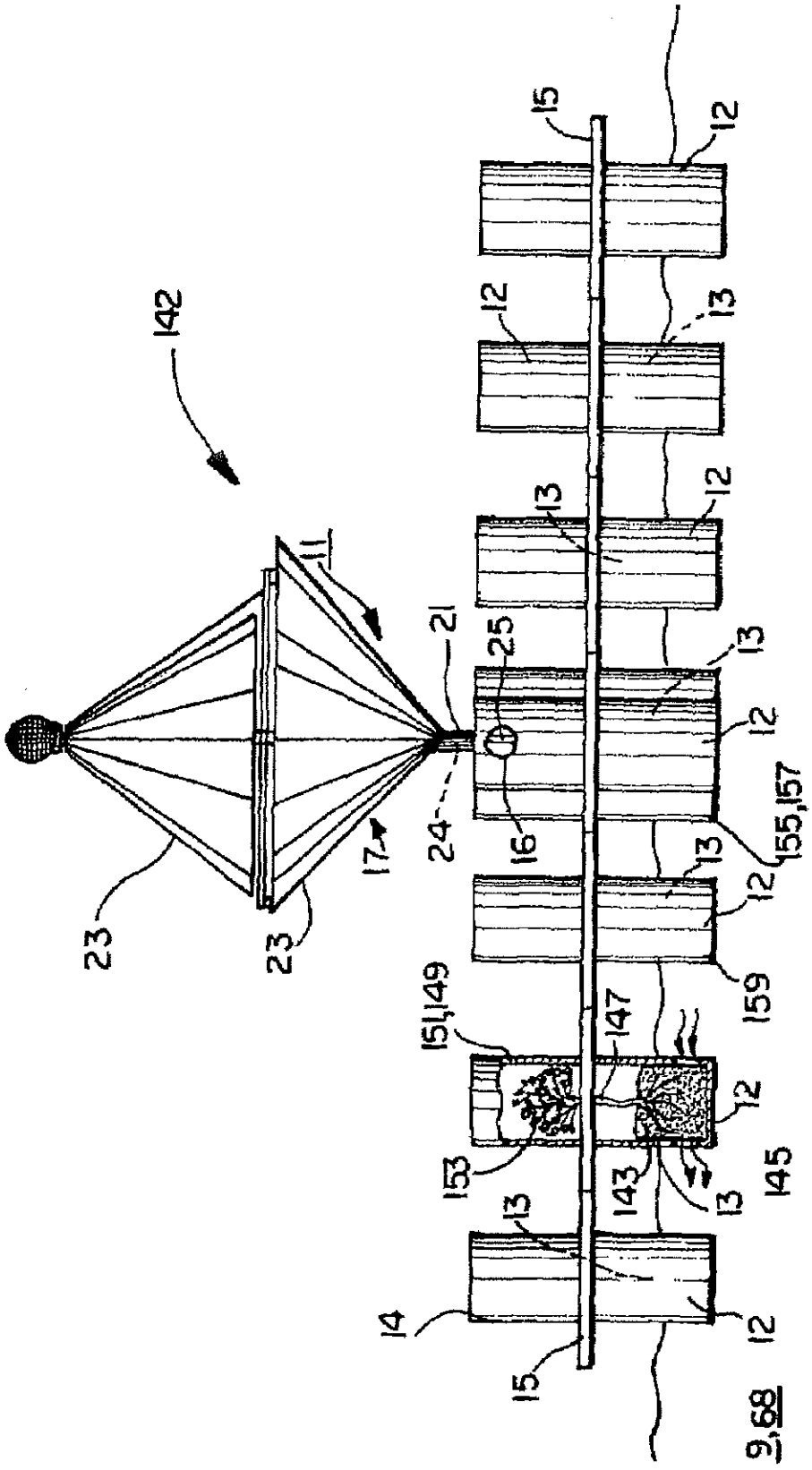
142
11
21
25
24
16
17
23
23
15
12
13
155,157
159
151,149
147
153
143
145
14
9,68

FIG. 15

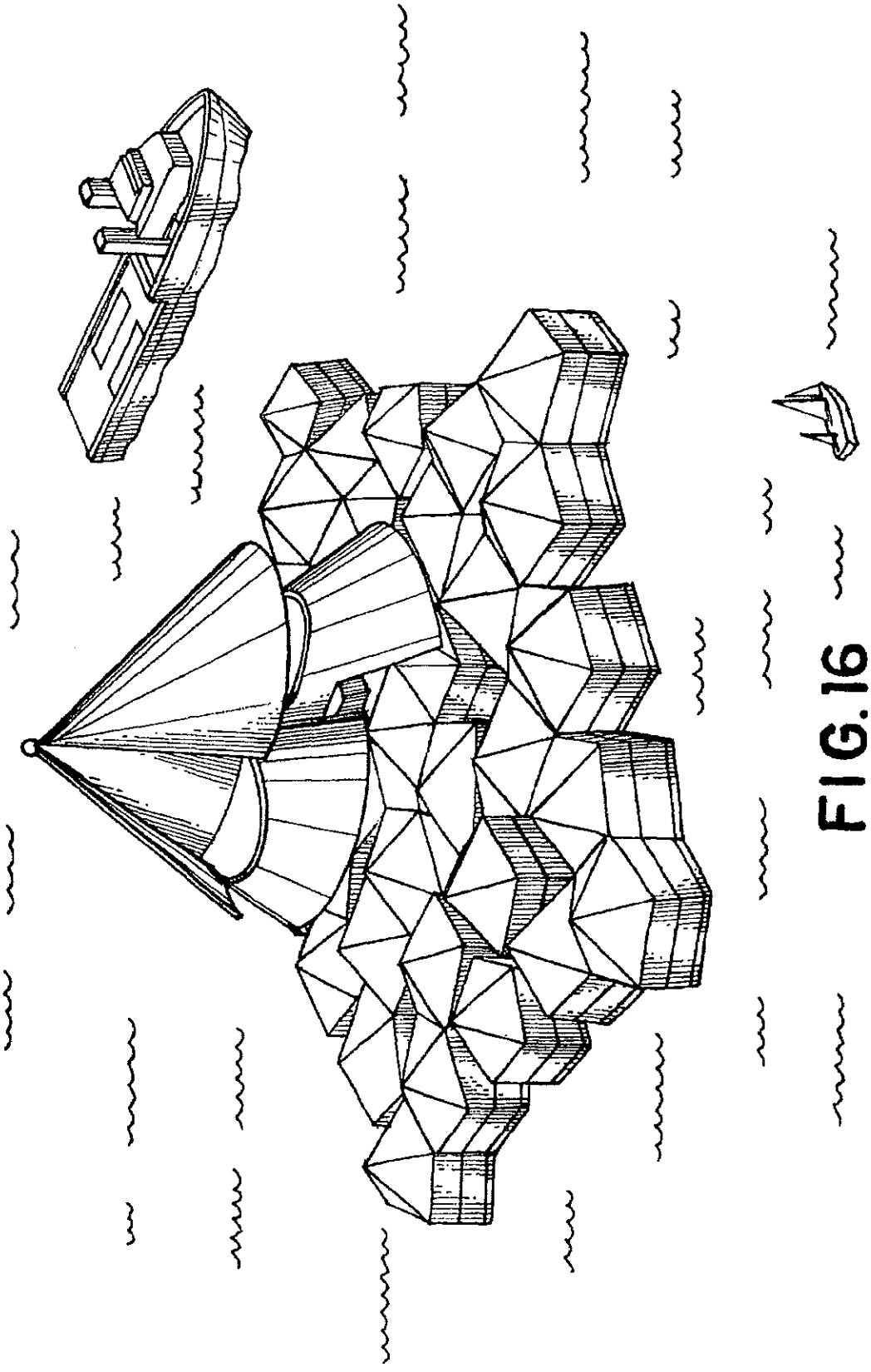

FIG.16

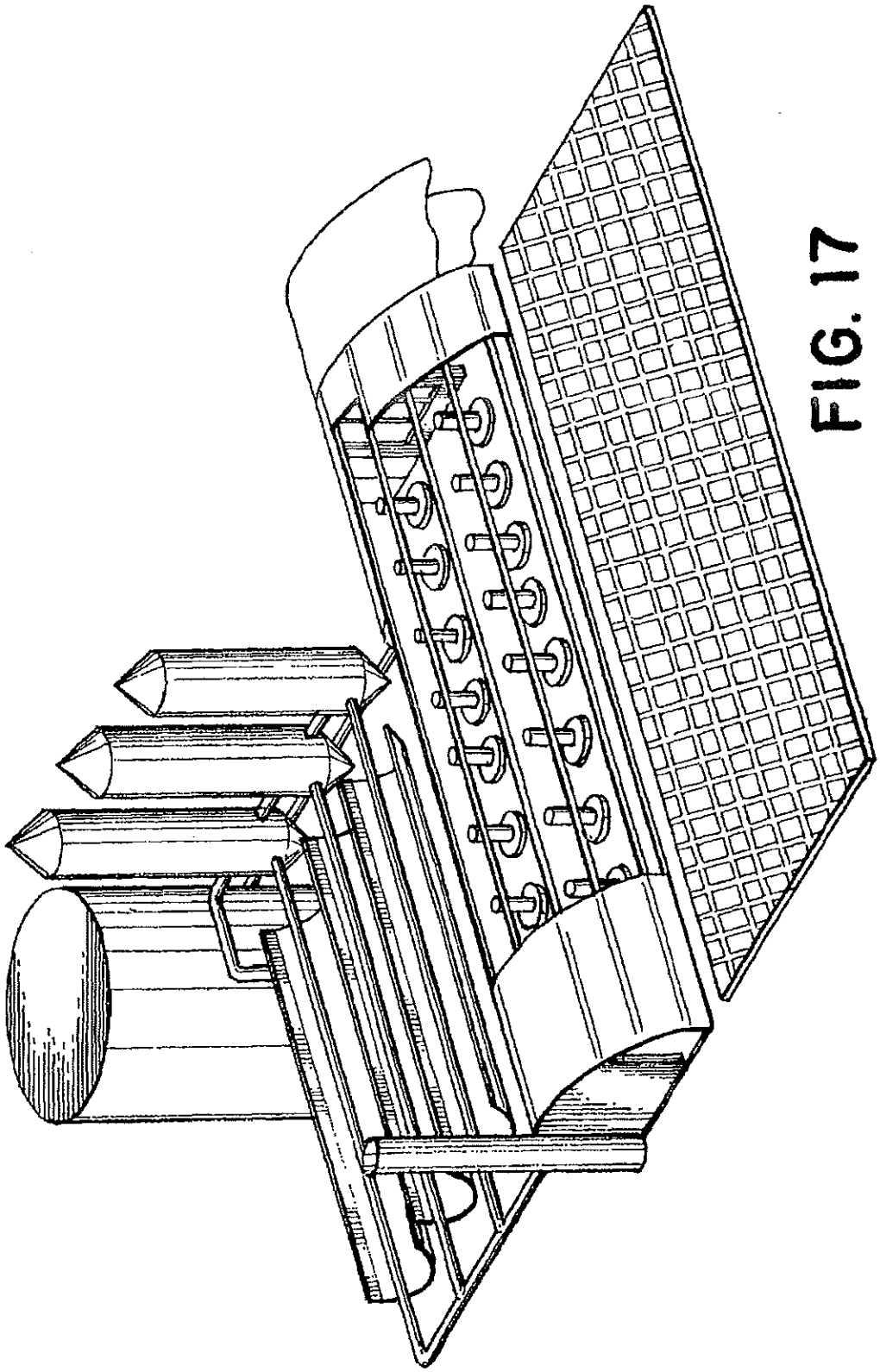

FIG. 17

SYSTEMS AND VESSELS FOR PRODUCING HYDROCARBONS AND/OR WATER, AND METHODS FOR SAME

CROSS REFERENCE TO RELATED APPLICATIONS

This application claims the benefit under 35 U.S.C. Section 119(e) of prior filed provisional application No. 60/874,504 filed on Dec. 13, 2006; and this application claims the benefit under 35 U.S.C. Section 120 of prior filed non-provisional application Ser. No. 11/189,430 filed on Jul. 25, 2005, which issued as U.S. Pat. No. 7,302,903 on Dec. 4, 2007, and which claims the benefit under 35 USC Section 119(e) of prior filed provisional application No. 60/590,731 filed Jul. 23, 2004.

BACKGROUND OF INVENTION

1. Field of the Invention

The present invention relates to the production of hydrocarbons and/or purified water, and more particularly concerns the production of hydrocarbons and/or purified water using air, water and wind energy as raw materials. This invention also relates to producing water utilizing trees and plantlife.

2. Brief Description of Prior Art

There is an ongoing erosion of energy generating capacity in North America, especially with respect to base load generating facilities. Base load energy is the least costly energy to produce by power companies. Because of environmental and industry regulation and significant market changes, utilities foresee that base load energy production will not keep pace with demand, therefore requiring the generation of additional energy using other more costly means. This is especially troublesome because base-load energy plants are usually the most costly and time consuming to construct, traditionally being coal, nuclear, heavy oil or hydro-electric plants. Some new combined cycle plants have slightly shorter construction time, but they are still costly to build and are dependant on natural gas or light oil, both fuels with a volatile price history.

The electric utility companies could increase their base-load energy capacity by 30 percent overnight if they use their peak load combustion turbines for base load power. Presently this is not possible because these turbines are simple-cycle gas turbines with a maximum thermal-dynamic efficiency of 25 percent. Additionally, they can only be run for a limited number of hours a day since they do not conform to air pollution standards. Because of these factors, they cannot be run profitably and are used only to make up for small, short term power short falls, as might occur during the morning and evening peak demand times. To operate these plants for base load profitability, in an environmentally clean manner, power producers would require a fuel that does not cause noxious emissions and sells at an economically feasible price. Several fuels possess one or the other of these desired traits, but none possesses both traits.

There is an ongoing increase in need for potable water supply throughout the world, especially in high population density areas. Use of the ocean water as the source water for potable water has been prohibitive due to the costs of treatment. Accordingly, it would be desirable to use the ocean water as a source to provide potable drinking water without expending large amounts of non renewable energy.

SUMMARY OF THE INVENTION

It is an object of this invention to provide a system, or unmanned self-propelled robotic vessel that converts wind energy into ethanol or other hydrocarbons by processing sea water and air. The system can be land based or affixed to a platform exiting over a body of water.

It is another object to provide a system, or vessel that produces hydrocarbons by cultivating algae and catalyzing said algae with a catalyst to create a hydrocarbon product.

It is another object to provide a clean burning fuel that is economical enough for power companies to generate a profit, by lowering the current costs for using turbines to generate electricity at levels above the base load energy level.

It is another object of this invention to provide potable water from sea water using renewable energy and/or the transpiration processes of plants, trees, and other vegetation.

These and other objects are accomplished by my invention which is set out below.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a side elevational view of a floating vessel constructed in accordance with the invention, with the structural cables not shown. The structural cables are not shown in FIG. **1** or FIGS. **2-3** so as not to block the view of other components of the vessel. However, the structural cables are shown in FIG. **4**.

FIG. **2** is a perspective view of the floating vessel of FIG. **1**.

FIG. **3** is a top plan view of the floating vessel of FIG. **1**.

FIG. **4** is a view in side elevation of the vessel of FIGS. **1-3**, illustrating the placement of the structural cables.

FIG. **5** is a schematic of the hydrocarbon production process of the invention.

FIG. **6** is a schematic of the electrical power system of the invention.

FIG. **7** is a side elevational view of a platform system housing the invention.

FIG. **8** is a plan cross section view of the hollow mast.

FIG. **9** is an elevational cross sectional view of the hollow mast shown at its interface with the source water.

FIG. **10** is a view and cross section of the hollow mast at the upper portion.

FIG. **11** is a schematic of the water purifier.

FIG. **12** is a partial sectional plan view of a vacuum system.

FIG. **13** is a schematic of the algae derived hydrocarbon production system **127** and process of the invention.

FIG. **14** is a schematic of the algae derived hydrocarbon production system **127** and process of the invention utilizing a cavatation inducing nozzle as a catalyzer.

FIG. **15** is a partial side elevational view of a floating vessel rated to produce water using trees, plants, bushes, and other vegetation.

FIG. **16** is an isometric view of a floating vessel rated to produce water using trees, plants, bushes, and other vegetation.

FIG. **17** is an isometric view of an algae conversion plant.

DETAILED DESCRIPTION OF THE INVENTION

Turning to the drawings, there is shown a floating vessel **11** for producing hydrocarbons comprising one or more containers **12** having a chamber **13** formed therein, a structural frame **15** for interconnecting the one or more containers **12**, a power system **16** for producing, storing, and distributing power, and a hydrocarbon processor **27**.

In the preferred embodiment shown in the drawings, the structural frame **15**, using structural cables **20**; as shown in FIG. **4**, has a tensigrity structure using a third magnitude octal truss **16** made of aluminum and stainless steel.

In this preferred embodiment, as shown in FIG. **3**, vessel **11** has 81 separate containers **12** in a 9×9 array. The chambers **13** of the containers **12** serve, variously, as floatation chambers **51** (also marked with the letter "F" in FIG. **3**), ballast chambers **53** (also marked with the letter "B" in FIG. **3**), process chambers **55** (also marked with the letter "P" in FIG. **3**), and storage chambers **57** (also marked with the letter "S" in FIG. **3**). Preferably, the outer containers **12** act as flotation chambers **51** and ballast chambers **53** exclusively to protect the stored hydrocarbon in the event of a collision. Regarding storage, the hydrocarbon produced, such as ethanol, preferably may be stored in flexible bladders that are positioned in storage chambers **57**. Preferably, storage chambers **57** are positioned inwardly of ballast chambers **53** and floatation chambers **51**, and three containers **12** (a flotation chamber **51**, a ballast chamber **53**, and a storage chamber **57**) must be compromised for ethanol to leak. Moreover, the ethanol would be diluted to 20 percent by the water that the vessel **11** is in, well below flammability and toxicity levels. In this preferred embodiment, the structure is extremely strong, able to withstand 5000 psi, but it only weighs 6 tons empty.

The power system **16** comprises a wind turbine **17**, an electrical generator **25**, and a power storage and regulation element **19**. The wind turbine **17** harnesses the wind energy. The wind turbine **17** has a rotatable shaft **21** and one or more rotor blades **23** connected to the rotatable shaft **21**. The rotatable shaft **21** is preferably hollow and is rotatably mounted over a hollow mast **24** of the vessel **11**. An electrical generator **25** is mechanically coupled with the rotatable shaft **21** for producing electrical energy when wind blows against the one or more rotor blades **23** causing the rotatable shaft **21** to rotate around the mast **24**.

The rotor blades **23** are cup shaped to catch the wind, and are preferably lined with aluminum, which gives the vessel **11** enhanced radar visibility. Preferably, the rotor blades **23** are made of soft construction and are slow moving in nature to prevent being a hazard to sea birds. Preferably, the power storage and regulation element **19**, which is linked to the generator **25**, comprises batteries and a battery charging system, which stores energy from the generator **25**.

Disposed within one or more chambers **13** is a hydrocarbon processor **27**. The hydrocarbon processor **27** comprises a carbon dioxide interface **29** (shown in FIG. **5**) for introducing carbon dioxide to the hydrocarbon processor **27**. The processor **27** further comprises an electrolizer **35**, which is powered by electrical energy from the power storage and regulation element **19**, for converting water, via electrolysis, into hydrogen and oxygen for providing a hydrogen effluent stream **37**. The processor **27** further comprises a reverse water gas shift (RWGS) reactor **45** adapted to receive the hydrogen effluent stream **37** and the carbon dioxide and oxygen in a stream **41** from the electrolyzer **35**, for converting the carbon dioxide and hydrogen in the presence of a catalyst into an RWGS effluent stream **47** comprising carbon monoxide and water. The processor **27** has an ethanation reactor **49** adapted to convert the RWGS effluent stream **47** in the presence of a catalyst into the product hydrocarbon.

In the preferred embodiment of the invention illustrated in the drawings, the vessel **11** is provided with a vacuum pump **50** which draws water from the body of water/water source **9** in which the vessel **11** is located into and through a passageway extending along the central axis of the hollow mast **24** to a flow line **52** leading into the electrolyzer **35**. Specifically, the water is drawn up from the body of water/water source **9** using the vacuum pump **50** and taken through the passageway in the mast **24** to the upper end portion of the mast **24**, where the water is vaporized through flash distillation. The vaporized water is then condensed and fed to the electrolyzer **35**. Preferably, 40 gallons of water per minute is drawn by the vacuum pump **50**.

The carbon dioxide interface **29** preferably comprises a chamber **33** that is open to the surrounding air, and the chamber **33** is provided with a vent through which carbon dioxide contained in the air in the chamber **33** is drawn and absorbed into the condensed water being fed into the electrolyzer **35** through line **52**.

In the preferred embodiment illustrated herein, the vessel **11** is 82 feet long and has a beam of 82 feet. In this preferred embodiment, the vessel **11** extends 73 feet above water in use. In this preferred embodiment, the draft (empty) is 3 feet and the draft (loaded) is 6 feet. In this preferred embodiment, the vessel **11** displaces approximately 6 tons (empty) and 250 tons (loaded), has a storage capacity of 80,000 gallons, and travels at a top speed of 14 knots. In this preferred embodiment, the electrical generator **25**, is a 1000 kilowatt generator.

As for auxiliary systems, the vessel **11** preferably is provided with its own propulsion system which is controlled by an onboard computer or by remote commands from a control center on land. Also, the vessel **11** preferably is provided with GPS tracking, radar, sonar, video (visible and infrared), and equipment to measure environmental conditions such a wind speed, wind direction, air temperature, water temperature, salinity, and currents.

Preferably, the vessel **11** is controlled by remote operation via a satellite or VHF emergency controls, but also is capable of autonomous operation via a predetermined instruction set.

The control system provided to the vessel **11** allows for the operation and monitoring of the power system **16** and the hydrocarbon processor **27**, according to optimal design parameters for the production of the hydrocarbons.

The power storage and regulation element **19** is connected to and supplies power to the various systems of the vessel **11**, such as the processor **27**, the onboard computer, and the various auxiliary systems.

Preferably, the vessel **11** is constructed of aluminum and plastic (PVC, HDPE, Shearfil, and Tefzel).

In use, the vessel **11** is positioned in a body of water, such as the ocean or a lake, to have access to a water source and a wind source. Wind blowing against the rotor blades **23** of the wind turbine **17** causes the rotatable shaft **21** of the wind turbine **17** to rotate to drive the electrical generator **25** to produce electrical energy. Preferably this mechanical coupling is achieved by means of a gear train **89**, wherein a sun gear **91** is attached to and shares the same axis with the rotable shaft **21**. The sun gear meshes with on or more planet gears **93**, which share a central axis with a planet shaft **95**, which is mechanically coupled with electrical generator **25**. The electrical energy produced by the generator **25** is transferred to the power storage and regulation element **19** for storage and subsequent use by the vessel **11**.

During use, electricity from the power storage and regulation element **19** is transferred to the electrolyzer **35** and the vacuum pump **50** to drive these units. Alternately, the vacuum pump **50** is driven by being mechanically coupled to the wind turbine **17**. Preferably this mechanical coupling is achieved by means of a gear train **89**, wherein a sun gear **91** is attached to and shares the same axis with the rotable shaft **21**. The sun gear meshes with on or more planet gears, which share a central axis with a planet shaft **95**, which is mechanically coupled with vacuum **50**.

Vacuum pump **50** draws water from the body of water in which the vessel **11** is located and into and through a passageway **63** extending along the central axis of the hollow mast **24** to the upper end portion of the mast **24**, where the water is

vaporized through flash distillation. The vaporized water is then condensed and fed to the electrolyzer **35**. Prior to entering the electrolyzer **35**, the condensed water absorbs carbon dioxide at the carbon dioxide interface **29**. The electrolyzer **35** converts the water via electrolysis, into hydrogen and oxygen, and this hydrogen, oxygen, and the carbon dioxide absorbed by the condensed water fed to the electrolyzer **35** are then fed to the RWGS reactor **45**, which converts the carbon dioxide and hydrogen in the presence of a catalyst into the RWGS effluent stream **47** which comprises carbon monoxide and water. The RWGS effluent stream **47** is then fed into the ethanation reactor **49**, which converts RWGS effluent stream **47** in the presence of a catalyst into the product hydrocarbon.

As discussed herein, the vacuum pump **50** may be substituted with a venturi system **101** to exert a vacuum extracting water vapor **76** from water **68** through flash distillation in a similar fashion as the vacuum pump **50**. Turning to FIG. **12**, there is shown in partial plan view the venturi system **101**. The system **101** including a venturi duct **103** and a fan **105**, the venturi duct **103** defined by an upstream opening **107** defining a first cross sectional area **109** at a first end **111**, a downstream opening **113** having a second cross sectional area **115** at a second end **117** and one or more duct walls **119** connecting the upstream opening **107** to the downstream opening **113**. The venturi duct **103** further having a throat section **121** defined by the one or more duct walls **119** located between the upstream opening **107** and the downstream opening **113** and having a throat cross sectional area **121** that is less than the first cross sectional area **109**.

The venturi system **101** further includes a fan **105** connected or proximate to the upstream opening **107** of the venturi duct **103** for directing a flow of air through the venturi duct **103** from the upstream opening **107** to the downstream opening **113**.

In operation, the fan **105** draws an air flow through the throat section **121** through the duct **103**, wherein the pressure at the throat section **121** is decreased, and a vacuum is caused to be exerted on the second opening **69** of the conduit **63** because the conduit **63** is in communication with the port **125** located in the one or more duct walls **119** at the throat section **121**. As a result, water vapor **76** is pulled from the conduit **63**, which is submerged in water **69**.

The hydrocarbon product produced by the hydrocarbon processor **27** of the vessel **11** is fed from the ethanation reactor **49** via lines into storage chambers **57**, which may be periodically unloaded and used as an energy source, for example, a fuel for driving energy turbines for creating electricity.

The hydrocarbon produced in accordance with the invention is preferably ethanol, but other hydrocarbon products may be produced as desired. Exemplary of these other products are methanol, ethanated olifins (diesel), ethanated esters, and dimethylethane. Such products may be produced using appropriate catalysts in the hydrocarbon processor **27** as is known in the art, to create the appropriate reaction to produce the desired hydrocarbon product.

Exemplary catalysts include iron, copper, iridium, and combinations thereof.

Optionally, pumps may be provided along the lines in the processor **27** as needed when heavier hydrocarbons are being produced.

The vessel **11** may also be configured to collect the byproduct potable water produced by hydrocarbon processor **27**.

Preferably, vessel **11** operates away from commercial traffic. The land-based operators may detect—via radar, sonar and video—the presence of other vessels, e.g. ships, from a considerable distance. If required, the vessel **11** may be programmed to detect approaching ships and move to avoid them, or the vessel **11** may be moved by the instructions from an operator. In the event of storms, the vessel **11** attempts first to reach safe waters. If this is impossible, the vessel **11** may submerge itself, if instructed to do so in deep water to avoid waves and other vessels. The vessel **11** preferably broadcasts continuously on both radar and sonar transponders while operating in the open sea.

An exemplary operating area is the Mid-Atlantic coastal area near New Jersey and Delaware. This area has proximity to energy users, favorable wind and sea conditions, and it is a large, relatively shallow area where tankers and freighters tend to stay in well-defined areas. The vessels **11** preferably are shallow-draft, preferably drawing only 6 feet when fully loaded, and may be positioned in areas too shallow for commercial cargo vessels to traverse, preferably areas of 50 feet or less. Generally, the vessels are positioned far enough off-shore to be invisible to beach resorts, preferably operating between 10 and 30 miles off-shore.

In a preferred embodiment, the vessel **11** is configured to possess a number of failsafe measures. If a vessel **11** loses the link to the control center, it may be programmed to immediately cease production, and attempts to re-establish a link via VHF. If this fails, the vessel **11** may be programmed to immediately go to station-keeping mode and to activate its transponders, lights and horns as needed. If no contact is made within four (4) hours or storm conditions occur while off-link, the vessel **11** may be programmed to submerge itself and deploy a transponder buoy.

Concerning a preferred overall design, the wind turbine **17** is a slow turning vertical axis machine design to be harmless to birds. It has an aluminum shaft **21**, stainless steel rigging and Shearfil rotor blades **23**. This is an environmentally inert, flexible material developed for the Apollo space suits. The wind turbine **17** stands 65 feet tall and rotates at 23 RPM at full power. It may also be lined with aluminum foil to make it highly visible to radar.

The vessel **11** preferably is illuminated by lights and has both sonar and radar transponders. The operator uses a television camera capable of transmitting images in both the visible and infra-red spectrum for a real-time image of the platform's location.

In a preferred embodiment the operator's display is overlaid with plots of other vessels, if nearby, and weather and sea data, such as temperature, wind speed, direction, humidity. Additional continuous data streams, for example data from the Rutgers Marine Research Center at Tuckahoe, N.J., LEO-15 and NDBC buoy 44009, are also integrated into the display.

The wind turbine **17** generates 1,300 HP at full power and all of this power may be made available through jetpumps, to propel the platform **11**. The vessel **11** is a tele-operated/telemetric machine, similar to the Predator drones, and may have an added artificial intelligence function that allows it to report its condition and perform certain functions independently should the need arise. Telemetry is sent continuously in real time, via satellite internet connection, with conventional VHF back-ups. Under normal mode the vessel **11** goes to a location selected by the operator. This preferably is an area clear of commercial shipping and fishing, where the winds are suitable. Once on station, the vessel **11** holds within 100 yards of the preset location using thrusters to hold its position. During the next 12 to 48 hours the vessel **11** produces ethanol and then requests off-loading. When that time is near the vessel **11** moves to a rendezvous with a barge/tug where a crew transfers the hydrocarbon product, e.g. ethanol and brings the hydrocarbon product ashore. All off-loading is

done under direct human presence. Once empty, vessel **11** returns to its station to repeat the process. Should bad weather be reported, the platform **11** may off-load to a barge and proceed to a safe harbor, or may move out of the storm path to some other operating area. In an emergency, the vessel **11** may submerge itself so as to not be a hazard to navigation and await retrieval after the storm passes. The vessel **11** can go to 200 feet and hold sufficient compressed air to both hold at that depth for 5 days and refill their ballast tanks to surface when the retrieval commands are received. For additional safety, the Coast Guard, may take over direct operation of the vessels to use as monitoring platforms, if desired.

The vessel **11** can be rated to produce purified water, as an alternative embodiment of the invention, by including a water purifier **61** in addition to or in place of the hydrocarbon processor **27**.

Turning to FIG. **11** there is shown a schematic of a water purifier **61**. The water purifier **61** including a conduit **63**, the conduit **63** comprising a first rim **65** defining a first opening **67**, and a second rim **69** defining a second opening **71**, and at least one conduit wall **73** extending from the first rim **65** to an elevation that is higher than the phase change elevation **75** of water to the second rim **69**. This configuration allows water vapor to separate from the water **68** and travel to the second opening **71** of the conduit **63** when a vacuum is applied to the conduit **63**. The water purifier **61** further includes a vacuum device **50/103** for applying a vacuum. As discussed herein the vacuum device **50/103** may comprise a venturi system **103** or a vacuum pump **50** powered by a wind turbine **17** for harnessing the wind energy, the wind turbine **17** having a rotateable shaft **21** and one or more rotor blades **23** connected to the rotateable shaft **21**. In use, the first opening of the conduit **63** is submerged in the water **68**. The vacuum device **50/103** is in communication with the second opening **71** exerting a vacuum sufficient to reduce the pressure inside the conduit **63** to the vapor pressure of the water **68** thereby raising the water **68** in the conduit **63** to a phase change elevation **75** where the water **68** changes state from liquid to vapor **76**, allowing water vapors **76** to be pulled through the vacuum device **50/103** and discharged into a collection container **14** to collect condensed water **81**.

In operation water is produced by turning a wind turbine **17** to effect generation of electricity in a generator **25**, transferring electricity produced by the generator **25** to enable a vacuum device **50/101** and/or one or more process controls. A vacuum is then exerted on a water source **9** to extract water vapor **76**. The water vapor **76** is then condensed and water vapor **76** that has condensed as water is collected. As discussed herein the step of exerting a vacuum on a water source to extract water vapor **76** may comprise providing a conduit **63**, the conduit **63** comprising a first rim **65** defining a first opening **67** a second rim **69** defining a second opening **71** and at least one conduit wall **73** extending from the first rim **65** to an elevation that is higher than the phase change elevation **75** of water to the second rim **69** thereby allowing water vapor **76** to separate from the water **68** and travel to the second opening **71** of the conduit **63** with a negative pressure/vacuum is applied to the conduit **63**. The first opening **67** of the conduit **63** is submerged in water **68**. The second opening of the conduit **63** is then connected to a vacuum pump **50**. A negative pressure is then applied to the second opening **71**, of the conduit **63** with the vacuum pump **50**, thereby causing water **68** from the water source **9** to be drawn upwardly into the conduit to the phase change elevation **75** wherein water vapor **76** is separated from the water **68** and pulled toward the second opening **71** of the conduit **63** into a collection container **14**, wherein the vapors cool and collect as for condensate.

Alternately, the step of exerting a vacuum on a water source **9**, **68** to extract water vapor **76**, comprises providing a venturi system **101** as disclosed herein. The method further includes the step of providing a conduit **63**, the conduit **63** comprising a first rim **65** defining a first opening **67**, and a second rim **69** defining a second opening **71**, and at least one conduit wall **73** extending from the first rim **65** to an elevation that is higher than the phase change elevation **75** of water to the second rim **69**. The conduit **63** allows water vapor **76** to separate from the water **68** and travel to the second opening **71** of the conduit **63** when a negative pressure is applied to the conduit **63**. The first opening **67** of the conduit **63**, is then submerged in water **68** the second opening **71** of the conduit **63** is connected to a port **125** located in one or more duct walls **119** at the throat section **121** of the venturi duct **103**. Air is then forced through the duct **103**, thereby exerting a vacuum on the second opening **69** of the conduit **63**, causing water vapor **76** to separate from the water **68** inside the conduit **63** and travel to the second opening **69** of the conduit **63** wherein the vapor **76** is pulled through the venturi duct from the port **125** to the downstream opening **113** into a collection container **14**, wherein the vapors cool and collect as for condensate.

The step of forcing air through the duct **103** preferably comprises directing wind from a fan **105** into the duct **103**.

In one embodiment of the vessel **11** configured to produce purified water, the conduit **63** can reside within and extend along the central axis of the hollow mast **24**. In other embodiments, the conduit **63** can extend upwards without being integral to the hollow mast **24**.

FIGS. **8**, **9**, and **10** show how the conduit **63** can be integral to the hollow mast **24**. The lower opening **67** of the conduit **63** is submerged in the source water **68** where the vacuum pump **50** exerts a vacuum on the conduit **63**, pulling the source water **68** through the annular portion **85** of the hollow mast **24**. The vacuum pump **50** being connected with the center portion **83**. At a point above the phase change elevation **75**, the center portion **83** is joined with the annular portion **85** of the hollow mast **24** so to communicate the vapor **76** existing above the phase change elevation **75** through the vacuum pump **50** to a condensate tank **14**, which in this embodiment can be one or more of the containers **12** of the vessel **11**.

An alternate embodiment is shown in FIG. **7** which shows a system **10** affixed to a platform **8** extending over a body of water for producing purified water from wind energy and water. The platform system **10** comprises a power system **16** for producing, storing, and distributing power. The power system **16** includes a wind turbine **17** for harnessing the wind energy, the wind turbine **17** having a rotatable shaft **21** and one or more rotor blades **23** connecting to the rotatable shaft **21**. The power system **16** further includes an electrical generator **25** which is mechanically coupled via a gear train **89** with the rotatable shaft **21** for producing power when wind contacts the one or more rotor blades **23** causing the rotatable shaft **21** to rotate thereby producing power. The power system **16** further includes a power storage and regulation element **19** for regulating and storing the power produced by the generator **25**. The system **10** for producing purified water further includes a water purifier **61**. The water purifier **61** includes a conduit **63** comprising lower rim **65** that defines a lower opening **67** an upper rim **69** defining an upper opening **71** and a conduit wall **73** extending from and connecting the lower rim **65** to the upper rim **69**. The water purifier **61** further includes a vacuum pump **50** coupled with the conduit **63** at the upper opening **71** for applying a vacuum. The vacuum pump

50 may be powered by the power storage and regulation element 19, but the vacuum pump 50 is preferably mechanically coupled with and mechanically driven by the rotatable shaft 21 and gear train 89. The platform system 10 would further include a control system for regulating and/or monitoring the power system 16 and the water purifier 61.

In purifying the water the lower opening 67 of the conduit 63 is submerged, in or connected with another conduit that is submerged in, the source water 68 and the vacuum pump 50 exerts a vacuum sufficient to reduce the pressure inside the conduit 63 to the vapor pressure of the water thereby raising the water in the conduit 63 to a phase change elevation 75 where the water changes state from water to vapor 76. The upper opening 71 of the conduit 63 would be extended to an elevation higher than the phase change elevation 75 allowing the water vapor 76 to be pulled through the vacuum pump 50 and discharged to a condensate tank 14, which can be open to atmospheric pressure to collect condensate 81.

In alternate embodiment the water purifier 61 of my invention is provided on a platform 8.

Optionally, the water purifier 61 can further include a heating element 77 applied to the conduit 63 to regulate the temperature of the water and/or the water vapor and to prevent icing in the conduit 63. Optionally, the platform system 10 can further comprise a telemetric system for remote operation and monitoring.

As previously discussed, the water purifier 61 can be located on land, can be integral to a floating vessel, and also can be affixed to a platform 8 suspended over a body of water.

In use, purified water may be produced by providing the system 10 disclosed above, positioning the system 10 on, above, or proximate to a water source 9 turning the wind turbine 17 to affect generation of electricity in the generator, transferring electricity produced by the generator 25 to the vacuum pump 50 to enable the vacuum pump 50. Preferably, the vacuum pump 50 is mechanically driven by the rotatable wind turbine. A vacuum would be created in the conduit 63 to produce water vapor 76. The water vapor 76 would then be pulled through the vacuum pump 50. The water vapor 76 would be discharged to one or more containers 12 which may be open to atmospheric pressure and/or cooled to collect condensate 81.

Furthermore, in use, the purified water can be produced by turning a wind turbine 17 to effect generation of electricity in a generator 25 and to operate the vacuum pump 50, either through the turbine or by the power from the electrical generator 25. The forces of the vacuum pump 50 would create a vacuum in the conduit 63 to produce water vapor 76. Next, the water vapor 76 would be pulled through the vacuum pump 50 and then discharged to the one or more containers 12, which may be open to atmospheric pressure and or cooled to collect condensate water 81.

In an alternate embodiment the system 10 can be rated to produce hydrocarbons using air, water and wind. In this embodiment the platform system 10 would include the hydrocarbon processor 27 discussed herein.

Optionally, the system 10 equipped with telemetric equipment to provide for remote operation and monitoring. As a further option, the platform system 10 is equipped with control equipment to allow for autonomous operation.

The system 10, optionally, is configured to offload the product hydrocarbon or purified water by mean of a pipeline extending from the platform system 10 to a remote terminal.

Turning to FIG. 13 there is shown an algae based hydrocarbon processor 127, including a cyanobacteria cultivator 129 for cultivating a solution of cyanobacteria 131 utilizing the condensate water 81. Initially the cultivator 129 is inoculated with a colony. The cyanobacteria cultivator/algae cultivator 129, is contained in an environment that is conductive to the growth of algae/cyanobacteria said environment includes proper light, air, and temperature conditions and ability grow at an optimum rate. The algae based hydrocarbon processor 127 further includes a solution optimizer 133 for adjusting the amount of water 68 in the solution of cyanobacteria 131 and to create an optimized solution 135 of cyanobacteria and water. An optimized ratio is 9 to 1 cyanobacteria (such as spirulina) to water by mass. This is accomplished by adding water or reducing water in the solution of cyanobacteria 131. Reducing the water can be accomplished in a number of ways, which include heating or boiling or decanting the water, but preferably it is accomplished by connecting the solution optimizer 133 to a vacuum device 50/101. The vacuum device 50/101 preferably being a vacuum pump 50 or a venturi system 103. The hydrocarbon processor further includes a catalyzer 137 for causing a portion of the optimized solution 135 of cyanobacteria and water to reach a supercritical state where in a portion 139 of the optimized solution 135 is broken down into its elemental constituents creating a postsupercritical portion 141 of the optimized solution 135. The postsupercritical portion 141 being allowed to cool and condense as a hydrocarbon. The hydrocarbon processor 127 may further include a control system 143 for monitoring and controlling the various component of the hydrocarbon processor 127.

A portion of the remaining solution may be returned to the solution optimizer 133 in later steps to be reoptimized or adjusted based on the amount of water and then passed again to the catalyzer 137 for catalyzation to obtain more hydrocarbon product.

In one embodiment, the catalyzer 137 may comprise a pressure vessel having electrodes disposed within the pressure vessel for applying an electrical current to the optimized solution 135.

In an alternate embodiment, (FIG. 14) the catalyzer comprises a cavatition inducing nozzle wherein the optimized solution 135 is forced through said nozzle 147 with a pump 149, causing a portion of the optimized solution 135 to reach a supercritical state wherein said portion of the optimized solution 135 is reduced into its elemental constituents creating a postsupercritical portion 141 of the optimized solution 135 containing hydrocarbons after cooling and condensing in a condensing container 151.

It is known that organic molecules can be re-organized using super-critical pressures and temperatures. These changes occur when the molecules are heated to 1200+ degrees F. and entrained in a pressure vessel. What is less commonly known is these conditions of pressure and temperature occur inside cavitation bubbles. The principle of this apparatus is the controlled creation of cavitation in such a manner as to entrain a portion of a fluid containing water and organic molecules and subject the fluid to super-critical conditions.

The energy required to affect this change is then that energy required to bring the fluid to sufficient velocity and temperature to cavitate in a controlled manner.

Assume one gallon of fluid being sent through a typical linear venturi:

To induce cavitation requires a velocity of 100 feet per second if the fluid is at 150 degrees F. Using Boyle's law the change in velocity reduces the pressure to less than the vapor pressure of the fluid, inducing cavitation.

The energy required to accelerate the flow to 100 fps is 0.06 hp/gallon or 204.84 btu.

[Eulers Equation: $V^2/2*g=100^2/2*32.2=10000/64.4=155.28$ ft=$Hhp=Q*H/3960=(1$ gal*155.28)/3960=0.039 hp assume efficiency of 65%=0.039/0.35=0.06 hp]

Each pass through the venturi converts 3% of the fluid.

1 hp=2544 BTU

Therefore it requires 1404.84/0.03 or 46800 btu.

Based on lab tests, the resulting fluid contains 127,000 btu/gallon.

Thus the venturi reduces the conversion energy requirement to 35.34% of the energy produced.

Cavitation is a phenomenon that occurs under predictable conditions, but location of individual bubbles can not be calculated. The venturi redirects the energy of cavitation, normally associated with a 2 dimensional wave front, first into a controlled tetra-helical vortex, then compresses the three vortices into a rotating flow that also spirals around a center. In this way the energy distribution inside the flow is controlled, directed and non-random.

The primary rotation is nearly 15000 rpm. The pressure inside this rotating zone is absolute zero and the temperature is 1500 degrees F. However this zone is only 1000 Angstroms in diameter. The flow entrained inside the spiral is rotating at 2000 rpm inside a zone 0.04 inches in diameter. Its pressure is also absolute zero and its temperature is 630 degrees F. Since it is not ionized like the flow inside the primary vortex, there is an exchange of energy between the 2 zones causing oscillating zones of gas and liquid to exchange energy in a 'worm-like' motion. In this manner the cavitation is entrained inside the spiral.

The spiral is formed by the excess energy, commonly called turbulence, being focused to a single location, inducing a local vortex and allowing laminar flow in the rest of the stream. These phenomena are micro-events inside an otherwise stable streamline.

The invention of the algae based hydrocarbon processor **127** may be incorporated with a power system **16** for producing, storing, and distributing power. The power system **16** including the power system **16** as disclosed herein. Alternately, the algae based hydrocarbon processor **127** may be powered by more conventional means if available, such as grid power or power from a generator, or solar power, or any other power source.

The algae based hydrocarbons processor **127** may be incorporated into a floating vessel **11** as described herein or provided on a platform **8** proximate to a water source as disclosed herein. If the vessel **11** or platform **8** is placed on/proximate to a water source that has water of sufficient quality to cultivate the algae, the flash distillation equipment may not be necessary.

In operation, hydrocarbons are produced from algae and wind energy by performing the following steps: A wind turbine **17** is turned to effect generation of electricity in a generator **25**. The electricity produced by the generator **25** is transferred to enable any electrically operated devices. A vacuum is exerted on a water source **9**,**68** to extract water vapor **76**. The water vapor **76** is then condensed and used to cultivate cyanobacteria to create cyanobacteria solution **131**. The amount of water in the solution **131** is then adjusted to obtain an optimized solution **135** of cyanobacteria and water. The optimized solution **135** is then catalyzed, causing a portion of the optimized solution **135** to reach a supercritical state, wherein a portion of the optimized solution **135** is broken down into its elemental constituents creating a postsupercritical portion **141** of the optimized solution **135**. The optimized solution **135** and the postsupercritical portion **141** of the optimized solution **135** are then allowed to cool and condense, thereby forming a hydrocarbon product from the postsupercritical portion **141**.

In one embodiment the optimized solution **135** is catalyzed by applying an electrical current to the optimized solution **135**. In an alternate embodiment, the optimized solution **135** is catalyzed by forcing the optimized solution **135** through a cavatation inducing nozzle, causing a portion of the optimized solution **135** to reach a supercritical state, wherein said portion of the optimized solution **135** is broken down into its elemental constituents creating a postsupercritical portion **141** of the optimized solution **135**.

Alternately, water is purified using my invention by providing a transpiration system **142** adapted to a floating vessel **11** for producing purified water comprising one or more containers **12** having a chamber **14** therein a structural frame **15** for connecting the one or more chambers **12**, at least one of the one or more chambers **12** being a root chamber **143** for containing a root portion **145** of a plant or tree or similar vegetation **147**. Preferably halophytic plants are used in a saltwater environment to provide purified water via transpiration. At least another 149 of the one or more chambers **13** being a transpiration chamber **151** containing a nonroot containing portion **153** of the plant **147**. The invention further includes a temperature and humidity controller **155** for providing the root portion **145** of the plant and the nonroot portion **153** of the plant **147** with an optimum environment for transpiring water vapor. Further included is a nutrient controller **155** for maintaining the optimum delivery of nutrients to the root portion **145** of the plant **147** and or the nonroot portion **153** of the plant **147**. The system further includes a lighting controller **157** for maintaining optimum lighting within at least one of the one or more containers **12**. Further included in my invention is a power system **16** as disclosed herein including a wind turbine **17** electrical generator **25** and a power storage and regulation element **19**. Also included in the transpiration system **142** of my invention is a cooling container **159** that is ported to the nonroot chamber **151**.

In operation the temperature and humidity controller **155** is powered by the power system **16** and adapted to maintain optimal temperature and humidity, the nutrient controller is enabled to maintain optimal delivery of nutrients to the plant **147**, and the lighting controller is enabled to maintain optimal lighting to the one or more containers **12**, and where water passes into the root chamber **143** containing the root portion **145** of the plant **147** and the plant **147** absorbs the water **68** and transpires water vapor **76** from the nonroot portion **153** of the plant **147** into the transpiration chamber **151**, or the water vapor **76** passes into the cooling container **159** and condensate **81** is collected.

As applied to purifying contaminated and/or sea water, and referring to FIG. **16**, the plants are selected for ability to absorb, filter or disassemble the contaminants. They are then placed in an artificial environment where all relevant factors such as light levels, gas levels, nutrient levels, temperature and humidity are controlled and maintained at an optimal condition for the species.

The contaminated water is circulated around the plant roots. Via its natural transpiration, the plant absorbs the water and either filters the contaminants or disassembles them during photosynthesis. Pure water, as vapor, is expelled through the leaves.

The plant, being enclosed in a special chamber, means the vapors are unable to re-enter the general environment. The chamber is ported so as to direct the vapors to another chamber where the vapor is indirectly exposed to cooler air, and condenses, where it is collected and stored.

These chambers and ports can be discreet structures, or they can be integrated with, and congruent to, the glazing of the enclosure. Transpiration is enhanced by increasing the

levels of certain nutrients which induce the plants into a state of luxurious transpiration. Transpiration occurs 24 hours a day and light augmentation devices integral to the structure maintain full plant metabolism regardless of weather conditions.

Turning to FIG. **17**, It has long been known that algae could be converted into fuel, but the cost of the process has not been competitive with other methods. We have devised a new method that is very competitive with other synfuel processes and with petroleum based fuels.

The device consists of a translucent, closed tank where algae is grown under ideal conditions of light, air, temperature and nutrients. These inputs are produced via renewable energy sources such as wind turbines and photo-voltaic panels. These circulate air, collect water and provide supplemental light and heat. The systems are operated via an integrated series of sensors functioning as an analog logic circuit. These controls keep the biological processes functioning at their maximum rate and insulate the effects of weather and photo-period. This can be constructed as either a stationary or mobile apparatus.

In tandem with this tank is a protein separator which continuously removes and dewaters the algae. The water is returned to the algae tank while the extracted algae is sent to one of four processes.

Process 1: The algae dried in a solar-thermal dryer and then ground up into a dry powder. This is a fuel with the same heating value by weight as coal, and burns cleanly. Process 1B: This material may also be pyrolized into methane.

Process 2: After being dewatered, the algae is placed in sealed vessel where it is mechanically emulsified and blended with yeast. The yeast ferments the carbohydrates in the cell membrane, releasing the oils inside and yielding CO2 and ethanol. The CO2 is directed back to the algae tank to enhance growth. The resulting liquid is now a melange of oils and ethanol. The melange can be burned directly in external combustion engines as a substitute for fuel oil, or it is directed into clear tube and subjected to intense sunlight from a concentrating solar collector. The resulting heat and pressure turns the melange into biodiesel. After filtering out what solids may remain, the fuel can be combusted in an ordinary diesel engine.

Process 3: After being dewatered, the algae is directed into a clear tube and subjected to intense sunlight from a concentrating solar collector. The heat and UV rays convert the carbohydrates and the internal lipids into sugars. These are then moved to a sealed vessel, yeast is added and the liquid is fermented into ethanol. The CO2 from fermentation is directed back to the algae tank to enhance growth. The ethanol is extracted via a low temperature distillation process. The remaining liquid is used as nutrients for the algae.

Process 4: After being dewatered, the algae is placed in a sealed pressure vessel. There it is heated via induction of an electrical current, or concentrated solar radiation to super-critical temperature. The vessel is lined with a catalyst. The super-critical fluid is held for a short period of time, less than a minute, and then released from the vessel. The sudden release of pressure causes the fluid to cool and condense into a petroleum-like hydrocarbon blend.

ZENOC is Zero Emissions, NO Carbon clean, dispatchable power without emissions.

Fervilithic is from the Latin meaning fervid=very hot, and lithos=stone. Very hot stone. In concept it is a very simple way to store energy. In practice it is nearly as simple. Advances in materials such as high temperature insulating materials, and machine intelligence, make a commercially practical solution for green energy production. We use concentrating solar collectors, wind turbines and algae biomass. These send heat to a mass of thermal storage media. This container is surrounded by insulation. The media is heated to around 900 degrees F. Once the entire thermal 'battery' is charged the heat goes to a poly-phasic engine.

This engine is a Rankine-cycle engine in which multiple chambers are connected in series via one-way, pressure relief valves. It is filled with a non-combustible fluid. When heat is applied to the exterior of the chambers a small portion of the fluid changes state to a gas, increasing in volume to many times that of the chamber. Driven by this expansion, the fluid exits the chamber at high pressure and velocity in both a liquid and gaseous state. This liquid/gas is directed into a turbine with blades configured to convert the liquid portion of the flow into kinetic energy via an impulse exchange, while simultaneously converting the velocity of the gaseous portion into pressure energy via a reaction exchange. As the turbine absorbs the kinetic energy of the fluid as work, the fluid cools and the gaseous portion returns to a liquid within the flow. Downstream of the engine the fluid enters the chambers where the phase change of the gaseous portion causes a reduction in volume. The one way valves prevent a flow reversal therefore the resulting change in volume causes a pressure drop and cooling. Residual pressure inside the engine returns the liquid to the chambers where the cycle starts again.

The heat from the thermal battery can also be directed into existing Joule-cycle generating plants, instantly converting them to green, zero-emission power plants. This can be done at a fraction of the cost of new wind or photo-voltaic power plants.

Once charged the system can generate power for days without further input of energy due to new super-insulating materials. It allows the best of both worlds. It efficiently stores renewable energy when it is available, for use when it is needed in whatever quantity that is needed. The heat storage medium is chemically inert, non-pressurized and non-combustible. It is the safest energy storage system available.

The invention claimed is:

1. A system for producing hydrocarbons from wind energy, water, and air comprising:

a power system for producing, storing, and distributing power, the power system including:

a wind turbine for harnessing the wind energy, the wind turbine having a rotatable shaft and one or more rotor blades connected to the rotatable shaft,

an electrical generator mechanically coupled with the rotatable shaft for producing power when wind contacts the one or more rotor blades causing the rotatable shaft to rotate thereby producing power, and

a power storage and regulation element, for regulating and storing the power produced by the generator;

a water purifier, the water purifier including:

a conduit comprising a first rim defining a first opening, and second rim defining a second opening, and at least one conduit wall extending from the first rim to an elevation that is higher than the phase change elevation of water to the second rim, thereby allowing water vapor to separate from the water and travel to the second opening of the conduit when a vacuum is applied to the conduit, and

a vacuum device for applying a vacuum,

wherein the first opening of the conduit is submerged in the water, the vacuum device is in communication with the second opening exerting a vacuum sufficient to reduce the pressure inside the conduit to the vapor pressure of

the water thereby raising the water in the conduit to a phase change elevation where the water changes state from liquid to vapor, allowing the water vapor to be pulled through the vacuum pump and discharged a collection container, to collect condensate;

a hydrocarbon processor, the hydrocarbon processor including:

a carbon dioxide interface for introducing carbon dioxide to the hydrocarbon processor,

an electrolyzer adapted to receive power produced by the generator, and further adapted to convert water, via electrolysis, into hydrogen and oxygen, and provide a hydrogen effluent stream of hydrogen,

a reverse water gas shift (RWGS) reactor adapted to receive the hydrogen effluent stream from the electrolyzer and a carbon dioxide stream containing carbon dioxide for converting the carbon dioxide and hydrogen, in the presence of a catalyst, into a RWGS effluent stream comprising carbon monoxide and water, and

an ethanation reactor adapted to receive and convert the RWGS effluent stream, in the presence of a catalyst, into the hydrocarbon product; and

a control system for regulating and monitoring the power system and the hydrocarbon processor.

2. The system of claim **1**, the vacuum device including a vacuum pump, the vacuum pump being either mechanically adapted to operate from the turning of the rotatable shaft in response to the wind contacting the one or more rotor blades, or the vacuum pump being equipped with an electric motor that operates from the power produced by the generator.

3. The system of claim **1**, the vacuum device including a venturi duct and a fan, the venturi duct defined by an upstream opening defining a first cross sectional area at a first end, a downstream opening having a second cross sectional area at a second end, and one or more duct walls connecting the upstream opening to the downstream opening,

said duct having a throat section defined by the one or more duct walls, located between the upstream opening and the downstream opening, and having a throat cross sectional area that is less than the first cross sectional area, and

the venturi duct further being connected to the second opening of the conduit at a port located in the one or more duct walls at the throat section, whereby the fan directs airflow through the throat section of the duct, causing a drop in pressure and exerting a vacuum at the second opening of the conduit.

4. A system for producing hydrocarbons from wind energy, water, and algae comprising:

a power system for producing, storing, and distributing power, the power system including:

a wind turbine for harnessing the wind energy, the wind turbine having a rotatable shaft and one or more rotor blades connected to the rotatable shaft,

an electrical generator mechanically coupled with the rotatable shaft for producing power when wind contacts the one or more rotor blades causing the rotatable shaft to rotate thereby producing power, and

a power storage and regulation element, for regulating and storing the power produced by the generator;

a water purifier, the water purifier including:

a conduit, the conduit comprising a first rim defining a first opening, and second rim defining a second opening, and at least one conduit wall extending from the first rim to an elevation that is higher than the phase change elevation of water to the second rim, thereby allowing water vapor to separate from the water and travel to the second opening of the conduit when a vacuum is applied to the conduit, and

a vacuum device for applying a vacuum,

wherein the first opening of the conduit is submerged in the water, the vacuum device is in communication with the second opening exerting a vacuum sufficient to reduce the pressure inside the conduit to the vapor pressure of the water thereby raising the water in the conduit to a phase change elevation where the water changes state from liquid to vapor, allowing the water vapor to be pulled through the vacuum pump and discharged a collection container, to collect condensate water;

a hydrocarbon processor, the hydrocarbon processor including:

a cyanobacteria cultivator for cultivating a solution of cyanobacteria utilizing the condensate water,

a solution optimizer for adjusting the amount of water in the solution of cyanobacteria and water to create an optimized solution of cyanobacteria and water, and

a catalyzer for causing a portion of the optimized solution of cyanobacteria and water to reach a supercritical state, wherein a portion of the optimized solution is broken down into its elemental constituents creating a postsupercritical portion of the optimized solution; and

a control system for regulating and monitoring the power system and the hydrocarbon processor.

5. The system of claim **4**, the vacuum device including a vacuum pump, the vacuum pump being either mechanically adapted to operate from the turning of the rotatable shaft in response to the wind contacting the one or more rotor blades, or the vacuum pump being equipped with an electric motor that operates from the power produced by the generator.

6. The system of claim **4**, the vacuum device including a venturi duct and a fan, the venturi duct defined by defined by an upstream opening defining a first cross sectional area at a first end, a downstream opening having a second cross sectional area at a second end, and one or more duct walls connecting the upstream opening to the downstream opening,

said duct having a throat section defined by the one or more passageway walls, located between the upstream opening and the downstream opening, and having a throat cross sectional area that is less than the first cross sectional area, and

the venturi duct further being connected to the second opening of the conduit at a port located in the one or more duct walls at the throat section, whereby the fan directs airflow through the throat section of the duct, causing a drop in pressure and exerting a vacuum at the second opening of the conduit.

7. The system of claim **5**, wherein the catalyzer comprises a pressure vessel having electrodes disposed within the pressure vessel for applying an electrical current to the optimized solution.

8. The system of claim **6**, wherein the catalyzer comprises a pressure vessel having electrodes disposed within the pressure vessel for applying an electrical current to the optimized solution.

9. The system of claim **5**, wherein the catalyzer comprises a cavatition inducing nozzle, wherein the optimized solution is forced through said nozzle, causing a portion of the optimized solution to reach a supercritical state, wherein said portion of the optimized solution is reduced into its elemental constituents creating a postsupercritical portion of the optimized solution containing hydrocarbons after cooling and condensing.

10. The system of claim 6, wherein the catalyzer comprises a cavatition inducing nozzle, wherein the optimized solution is forced through said nozzle, causing a portion of the optimized solution to reach a supercritical state, wherein said portion of the optimized solution is reduced into its elemental constituents creating a postsupercritical portion of the optimized solution containing hydrocarbons after cooling and condensing.

11. A system for producing purified water from wind energy and water comprising:

a wind turbine for harnessing the wind energy, the wind turbine having a rotatable shaft and one or more rotor blades connected to the rotatable shaft,

a conduit, the conduit comprising a first rim defining a first opening, and second rim defining a second opening, and at least one conduit wall extending from the first rim to an elevation that is higher than the phase change elevation of water to the second rim, thereby allowing water vapor to separate from the water and travel to the second opening of the conduit when a vacuum is applied to the conduit, and

a vacuum device for applying a vacuum,

wherein the first opening of the conduit is submerged in the water, the vacuum device is in communication with the second opening exerting a vacuum sufficient to reduce the pressure inside the conduit to the vapor pressure of the water thereby raising the water in the conduit to a phase change elevation where the water changes state from liquid to vapor, allowing the water vapor to be pulled through the vacuum device and discharged into a collection container, to collect condensate water.

12. The system of claim 11, the vacuum device including a vacuum pump, the vacuum pump being either mechanically adapted to operate from the turning of the rotatable shaft in response to the wind contacting the one or more rotor blades, or the vacuum pump being equipped with an electric motor that operates from the power produced by the generator.

13. The system of claim 11, the vacuum device including a venturi duct and a fan, the venturi duct defined by defined by an upstream opening defining a first cross sectional area at a first end, a downstream opening having a second cross sectional area at a second end, and one or more duct walls connecting the upstream opening to the downstream opening,

said duct having a throat section defined by the one or more duct walls, located between the upstream opening and the downstream opening, and having a throat cross sectional area that is less than the first cross sectional area, and

the venturi duct further being connected to the second opening of the conduit at a port located in the one or more duct walls at the throat section, whereby the fan directs airflow through the throat section of the duct, causing a drop in pressure and exerting a vacuum at the second opening of the conduit.

14. A method for producing purified water comprising:

turning a wind turbine to effect generation of electricity in a generator;

transferring electricity produced by the generator to power one or more devices;

exerting a vacuum on a water source to extract water vapor;

condensing the water vapor; and

collecting the water vapor that condensed, wherein the step of exerting a vacuum on a water source to extract water vapor comprises

providing a conduit, the conduit comprising a first rim defining a first opening, and second rim defining a second opening, and at least one conduit wall extending from the first rim to an elevation that is higher than the phase change elevation of water to the second rim, thereby allowing water vapor to separate from the water and travel to the second opening of the conduit when a negative pressure is applied to the conduit,

submerging the first opening of the conduit in water,

connecting the second opening of the conduit to a vacuum pump, and

applying a negative pressure to the second opening of the conduit with the vacuum pump, thereby causing water from the water source to be drawn upwardly into the conduit to the phase change elevation, wherein the water vapor is separated from the water and pulled towards the second opening of the conduit.

15. A method for producing purified water comprising:

turning a wind turbine to effect generation of electricity in a generator;

transferring electricity produced by the generator to power one or more devices;

exerting a vacuum on a water source to extract water vapor;

condensing the water vapor; and

collecting the water vapor that condensed, wherein the step of exerting a vacuum on a water source to extract water vapor comprises

providing a duct defined by a upstream opening defining a first cross sectional area at a first end and a downstream opening having a second cross sectional area at a second end, and one or more duct walls connecting the upstream opening to the downstream opening, said duct having a throat section defined by the one or more duct walls, located between the upstream opening and the downstream opening, and having a throat cross sectional area that is less than the first cross sectional area,

providing a conduit, the conduit comprising a first rim defining a first opening, and second rim defining a second opening, and at least one conduit wall extending from the first rim to an elevation that is higher than the phase change elevation of water to the second rim, thereby allowing water vapor to separate from the water and travel to the second opening of the conduit when a negative pressure is applied to the conduit,

submerging the first opening of the conduit in water,

connecting the second opening of the conduit to a port located in the one or more duct walls

at the throat section, and

forcing air through the duct, thereby exerting a vacuum on the second opening.

16. The method of claim 15, wherein the step of forcing air through the duct is accomplished by directing wind from a fan into the duct.

17. A method for producing hydrocarbons, comprising:

turning a wind turbine to effect generation of electricity in a generator,

transferring electricity produced by the generator to an electrolyzer to enable the electrolyzer,

exerting a vacuum on a water source to extract water vapor,

condensing the water vapor,

cultivating cyanobacteria in the water condensed form the water vapor to create a solution of cyanobacteria and water,

adjusting the amount of water in the solution to obtain an optimized solution of cyanobacteria and water,

catalyzing the optimized solution, causing a portion of the optimized solution to reach a supercritical state, wherein said portion of the optimized solution is broken down into its elemental constituents creating a postsupercritical portion of the optimized solution,

allowing the optimized solution and the postsupercritical portion of the optimized solution to cool and condense, thereby forming a hydrocarbon product from the postsupercritical portion.

18. The method of claim **17**, the step of catalyzing the optimized solution including applying an electrical current to the optimized solution, causing a portion of the optimized solution to reach a supercritical state, wherein said portion of the optimized solution is broken down into its elemental constituents creating a postsupercritical portion of the optimized solution.

19. The method of claim **17**, the step of catalyzing the optimized solution including forcing the optimized solution through a cavitation inducing nozzle, causing a portion of the optimized solution to reach a supercritical state, wherein said portion of the optimized solution is broken down into its elemental constituents creating a postsupercritical portion of the optimized solution.

20. The system of claim **1**, further including a heating element applied to the conduit to regulate the temperature of the water and/or the water vapor and to prevent icing in the conduit.

21. The system of claim **1**, the vacuum pump being mechanically adapted to operate from the turning of the rotatable shaft in response to the wind contacting the one or more rotor blades.

22. The system of claim **1**, further comprising a telemetric system for remote operation and monitoring of the system.

23. The system of claim **1**, the system being integral to a floating vessel.

24. The system of claim **23**, the floating vessel comprising:

one or more containers having a chamber formed therein, and

a structural frame for interconnecting the one or more chambers.

25. The system of claim **22**, further comprising a navigation and propulsion system for permitting the system to traverse open waters.

26. The system of claim **25**, the navigation and propulsion system being adapted to be remotely operated and monitored.

27. A floating vessel for producing water comprising:

one or more containers having one or more chambers formed therein, at least one of the one or more chambers being a root chamber for containing a root portion of a plant, and at least another of the one or more chambers being a transpiration chamber containing a non root containing portion of the plant,

a temperature and humidity controller for providing the root portion of the plant and/or the non root portion of the plant with an optimal environment for transpiring water vapor,

a nutrient controller for maintaining the optimal delivery of nutrients the root portion of the plant and/or the non root portion of the plant,

a lighting controller for maintaining optimal lighting within at least one of the one or more containers,

a power system for producing, storing, and distributing power, the power system including:

a wind turbine for harnessing the wind energy, the wind turbine having a rotatable shaft and one or more rotor blades connected to the rotatable shaft,

an electrical generator mechanically coupled with the rotatable shaft for producing power when wind contacts the one or more rotor blades causing the rotatable shaft to rotate thereby producing power, and

a power storage and regulation element, for regulating and storing the power produced by

the generator; and

a cooling container that is ported to the non root chamber, wherein the temperature and humidity controller, the nutrient water passes into the root chamber containing the root portion of the plant and the plant absorbs the water and transpires water vapor from the non root portion of the plant into the transpiration chamber where the water vapor passes into the cooling container and cools and condensate is collected.

28. The system of claim **11**, further comprising a telemetric system for remote operation and monitoring of the system.

29. The system of claim **28**, the system being integral to a floating vessel.

* * * * *

EXHIBIT

B

Resolution

Appointment of Rudolph Behrens as a Vice President and Shareholder in Duckweed USA
Effective October 16, 2013

1.) It was agreed that Rudolph Behrens, will become a member of Duckweed USA.

2.) It was further agreed that he will assume the position of Vice President of Duckweed USA.

3.) It was further agreed that Rudolph will receive 2000 shares of stock in Duckweed USA.

4.) It was further agreed that the three principle members of the corporation, Michael Rigolizzo, Stephany Longo, and Rudolph Behrens will each have a 33 % equity position in Duckweed USA.

5.) It was further agreed that the issuance of any corporate stock shall require the signatures of Michael Rigolizzo, Stephany Longo, and Rudolph Behrens.

6.) It was further agreed that Rudolph Behrens will have a 50% voting privilege in all business conducted by Duckweed USA. Additionally, Michael Rigolizzo and Stephany Longo will share the remaining 50% of voting privileges in all business conducted by Duckweed USA.

7.) It was further agreed that Rudolph Behrens will contribute his professional expertise and patented process of turning aquatic biomass into vegetable oil that can be sold to refineries to make Biodiesel fuel and related products, referred to as "SF-1: Land-Based Synfuel Production System".

8.) It was further agreed that Duckweed USA will exclusively develop, market, and license commercial synfuel feedstock facility(s), utilizing the "SF-1: Land-Based Synfuel Production System".

9.) It was further agreed that Duckweed USA will develop, market and license Rudolph Behrens' patented "Andromeda 200 Bio-Solar Power Generating System" that converts aquatic biomass into electricity.

10/16/13

Michael Rigolizzo, Date
President

10-26-2013

Rudolph Behrens, Date
Vice President

10/16/13

Stephany Longo, Date
Vice President & Secretary

EXHIBIT

C

LVKN SYNFUEL PRODUCTION SYSTEM CONTRACT

STATE OF GEORGIA
COUNTY OF HANCOCK

THIS AGREEMENT, made and entered into between the City of Sparta, Georgia, a municipal corporation established, chartered, existing under the laws of the State of Georgia, acting by and through its Mayor and Council (hereinafter referred to as "City"), and Duckweed USA, a corporation organized under the laws of the State of New Jersey, (hereinafter referred to as "Duckweed").

WHEREAS, City owns and operates a wastewater treatment facility consisting of several ponds; and

WHEREAS, the ponds at said facility have duckweed and other biomass growing in them; and

WHEREAS, the biomass is a nuisance and the Georgia Environmental Protection Division (hereinafter referred to as "EPD") has required City to remove the biomass; and

WHEREAS, Duckweed has developed a method of converting such biomass into oil, which method is known as a LVKN Synfuel Production System (hereinafter referred to as "System"); and

WHEREAS, Duckweed believes that the City facility will produce biomass in sufficient quantities and qualities to be profitable; and

WHEREAS, City and Duckweed are desirous of entering into a contract to provide for the construction and operation of a LVKN Synfuel Production System and the rights and responsibilities of each party as relates to said system;

NOW, THEREFORE, it is mutually agreed as follows:

1. Duckweed will form a wholly owned subsidiary to construct, own, and operate the System.

2. Duckweed or its subsidiary will bear all costs of planning, constructing, and operating said System—including but not limited to all engineering costs, materials, labor, equipment, employee salaries, maintenance, administration, marketing, utilities, and taxes.

3. Duckweed or its subsidiary shall immediately pay any invoices for materials or equipment delivered to or labor performed at the facility so that no liens shall be filed against City or the wastewater facility.

4. The construction and operation of the System shall in no manner affect or impede the operation of the wastewater facility.

    a. Duckweed acknowledges that United States Department of Revenue—Rural Development (hereinafter referred to as "USDA") has a lien on the wastewater facility and has rules and regulations concerning its operation. Duckweed agrees to comply with any and all USDA rules and requirements for its operation of the System and to immediately cease construction or operation of the System should USDA notify City that said operation or construction violates any USDA rule or requirement.

b. Duckweed also acknowledges that EPD has rules and regulations which control the operation of the wastewater facility by City. Duckweed agrees that its construction and operation of the System will in no way violate any EPD rule or regulation. Duckweed agrees to comply with any and all EPD rules and requirements for its operation of the System and to immediately cease construction or operation of the System should EPD notify City that said operation or construction violates any EPD rule or requirement.

5. City shall be responsible for mowing the grass and other basic landscaping at the System's location. City shall have no other responsibilities for the System other than landscaping.

6. Duckweed will give preference to local hires recommended by the City of Sparta.

7. Duckweed shall pay City one-third (1/3rd) of the gross revenues derived from the operations of the System. Duckweed shall pay this monthly by the 30th of the month. Duckweed shall maintain customary accounting records and shall allow City or its representatives to access said accounting records to verify the accuracy of the monthly payments.

8. This contract shall run for a period of ten (10) years beginning on the execution herewith. This contract shall automatically renew for successive periods of ten (10) years unless either party hereto shall give written notice to the other party at least ninety (90) days before the renewal period begins.

9. Duckweed shall carry liability insurance in the amount of $1,000,000 with City as an additional insured. Additionally, Duckweed shall maintain whatever insurance coverage it desires on its personal property. City shall not be liable for any damage to or theft of Duckweed's personal property.

10. Each party agrees to indemnify the other as follows:

a. To the fullest extent permitted by law, Duckweed shall indemnify, defend and hold harmless City, and each of their agents, appointed officials, elected officials and employees, from and against any and all claims, losses and expenses, including attorneys' fees, arising out of (i) any breach by Duckweed of its obligations under this contract, (ii) any negligence or willful misconduct by Duckweed, its members, officers, agents or employees in connection with this contract or the design, construction or management of the System.

b. To the fullest extent permitted by law, City shall indemnify, defend and hold harmless Duckweed, and each of their members, officers, agents and employees from and against any and all claims, losses and expenses, including attorneys' fees, arising out of (i) any breach by City of its obligations hereunder, or (ii) the negligence or willful misconduct of City or its appointed or elected officials, agents or employees.

c. The provisions of this Indemnification Section shall survive this contract.

11. Should either party be in default under this contract, the non-defaulting party may give the defaulting party written notice of said default and the defaulting party shall have thirty (30) days from receipt of said notice to cure said default. If said default is not cured the non-defaulting party shall have the right to terminate the contract and shall have no liabilities to the defaulting party.

12. Any notices to be given under this contract should be mailed certified mail addressed as follows:

City of Sparta
Attn: Mayor William Evans
P.O. Drawer H
Sparta, GA 31087

Duckweed USA
Attn: Michael Rigolizzo
P.O. Box 472
Berlin, NJ 08009

13. This agreement shall be governed by the laws of the State of Georgia. Any dispute hereunder shall be adjudicated in the Superior Court of Hancock County.

14. Time is of the essence, and both parties agree to perform any duties in a timely manner.

IN WITNESS WHEREOF, the City and Duckweed have hereunto set their hands affixed their seals on this 4th day of August, 2014.

CITY OF SPARTA, GEORGIA

MAYOR

COUNCILMEMBER

COUNCILMEMBER

COUNCILMEMBER

COUNCILMEMBER

Attest:
Clerk, City of Sparta, Georgia
CITY OF SPARTA, GEORGIA

DUCKWEED USA

BY:
Michael Rigolizzo, Its President

EXHIBIT

D

THIS COMMISSION AGREEMENT is made and entered into this 25th day of February, 2015, between **Duckweed USA** (the "Company") and **Joseph Kearney** ("Broker").

In consideration of the mutual benefits and obligations of the parties set forth in this Agreement, the Company hereby retains the Broker to use its best efforts to solicit projects and investors for the development of our patented systems, subject to the following terms and conditions:

ARTICLE I OBLIGATIONS OF BROKER

Broker shall use its best efforts to find projects and an investor for the proposed projects. Broker shall (1) include the Company with other offerings maintained by Broker; (2) promptly notify the Company of prospective projects and investors; and (3) show the Company's premises and operations to prospective buyers. These potential projects may be located anywhere in the world to be eligible for the commissions enumerated below. The desire to develop the projects will be solely at the discretion of the Company.

ARTICLE II BROKER'S COMMISSION

2.1 Commission. Broker shall receive a commission of 5% of the investment capital raised for the development of the proposed projects if: (1) Broker procures an investor who is ready, willing, and able to invest on terms deemed acceptable by the Company in its sole and absolute discretion; and (2) investor is procured by the Broker during the term of this agreement or if, within 6 months after the termination of this contract, the proposed projects are developed with an investor who was first submitted to the Company by the Broker. The Broker's right to a commission will arise from any investment by an investor who is procured by the Broker for the term and survivorship of this agreement.

2.2 Expenses. The Company and the Broker shall each pay their own respective expenses involved in performance of their respective duties under this Agreement.

2.3 Payments to Broker. Compensation under this contract is strictly performance based. The 5% commission is to be paid on all monies received as they are received. In other words, if you bring someone to the table that pledges $10 million and transfers $2 million each month for a period of 5 months, as each installment is paid, you will receive your 5% on that amount of money received and cleared. All monies transferred and cleared for the Company in turn must also transfer any funds due to the Broker within ten (10) days of the cleared funds of the Company.

2.4 Residual Royalty. A residual royalty shall be paid to the Broker if he is successful in procuring the project and /or the investor and that project is successfully commissioned through the best efforts of Broker, Investor and Company collectively. That royalty shall amount to 2 cents per gallon generated at that facility during its initial contract period, usually 10 years or more. In the event that the contract should be renewed for an additional term, the royalty shall be reduced by 50% to 1 cent per gallon for this additional term. The royalty shall not accrue if the project and financing is procured by the Company itself.

ARTICLE III TYPE OF AGREEMENT

This agreement is, and shall be, an open agreement from the date first set forth above through March 1, 2017.

ARTICLE IV TERM

The rights and obligations of the parties shall commence on the date first set forth above, and shall terminate at midnight on March 1, 2017. This agreement may be cancelled by either party at any time after June 1, 2015, by 60 days' written notice.

ARTICLE V CONFIDENTIALITY

5.1 Confidentiality Obligations. During the term of this Agreement and for a period of tent (10) years thereafter, Broker shall maintain in confidence and use only for purposes of this Agreement any information or documentation which Company marks "Confidential" (collectively "Confidential Information"). To the extent it is reasonably necessary or appropriate to fulfill its obligations or exercise its rights under this Agreement, Broker may disclose Confidential Information which it is otherwise obligated under this Article not to disclose to its affiliates and to prospective buyers, on a need-to-know basis, on condition that such entities or persons agree to keep the Confidential Information confidential for the same time periods and to the same extent as Broker is required to keep the Confidential Information confidential.

5.2 Limitations on Usage. Except as expressly authorized by this Agreement or by other prior written consent of the Company, for the term of this Agreement and for ten (10) years thereafter, Broker shall not deliver, transmit, or provide to any person other than as permitted under this Agreement, and shall not use any of the Confidential Information, or authorize, cause, or aid anyone else to do so. Except as permitted in this Agreement, nothing shall be deemed to give Broker any right or license to use or to replicate or reproduce any of the Confidential Information, or to authorize, aid, or cause others so to do.

5.3 Survival. The covenants set forth in this Article V shall survive the termination of this Agreement and continue in full force and effect for ten (10) years without limitation.

ARTICLE VI GENERAL PROVISIONS

6.1 Binding Effect; Benefits. This Agreement shall insure to the benefit of the parties hereto and shall be binding upon the parties hereto and their respective heirs, successors, and assigns. Except as otherwise set forth herein, nothing in this Agreement, expressed or implied, is intended to confer on any person other than the parties hereto or their respective heirs, successors, and assigns any rights, remedies, obligations, or other liabilities under or by reason of this Agreement.

6.2 Governing Law. This Agreement shall be construed as to both validity and performance and enforced in accordance with and governed by the laws of the State of New Jersey.
6.3 Severability. If any term, covenant, condition, or provision of this Agreement or the application thereof to any circumstance shall be invalid or unenforceable to any extent, the remaining terms, conditions, and provisions of this Agreement shall not be affected thereby and each remaining term, covenant, condition, and provisions of this Agreement shall be valid and shall be enforceable to the fullest extent permitted by law. If any provision of this Agreement is so broad as to be unenforceable, such provisions shall be interpreted to be only as broad as is enforceable.

6.4 Entire Agreement. This Agreement shall constitute the entire agreement between the parties and any prior understanding or representation of any kind preceding the date of this Agreement shall not be binding on either party to this Agreement except to the extent incorporated in this Agreement.

6.5 Amendments. This Agreement may not be modified or changed except by an instrument or instruments in writing signed by the Company and the Broker.

6.6 Assignment. The rights and obligations of the parties under this Agreement shall not be assignable except with the prior written consent of the other party hereto.

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed as of the date first above written.

Duckweed USA ("Company")
PO Box 472
Berlin, NJ 08009

By: _____

Joseph Kearney ("Broker")
415 Wyoming Avenue
Wyoming, PA 18644

By: Joseph J. Kearney

EXHIBIT

E

LOAN AGREEMENT

THIS LOAN AGREEMENT is made this 6th day of March, 2015 by and between EPA MARKETING MANAGEMENT, INC., a Pennsylvania corporation, having an address of P.O. Box 640, Effort, PA 18330 ("EPA" or "Lender") and DUCKWEED USA, INC., a "C" corporation, having an address of P.O. Box 472, Berlin, NJ 08009 ("Duckweed" or "Borrower").

RECITALS

WHEREAS, Borrower is the owner of a certain patent that covers technology in connection with the refinement of organic matter into petroleum; and

WHEREAS, Borrower has requested from Lender financing in the amount of Forty-Five Thousand Five Hundred Dollars ($45,500.00) in connection with the construction of a prototype of a Linear Venturi Kinetic Nozzle Synfuel Production System for Rutgers University; and

WHEREAS, Lender, subject to the terms and conditions of this Agreement and a Promissory Note and Personal Guarantees executed contemporaneously herewith (collectively, the "Loan Documents"), is willing to make this Loan to Borrower;

NOW, THEREFORE, for and in consideration of the premises, terms, conditions and mutual promises set forth herein, and intending to be legally bound, the undersigned agree as follows:

I. LOAN TERMS AND CONDITIONS

A. Credit Extension

Upon the execution of the Loan Documents, EPA shall loan to the Borrower the sum of Forty-Five Thousand Five Hundred Dollars ($45,500.00).

B. Use of Proceeds

The proceeds of this Loan shall be used by Borrower for the purpose of constructing a prototype of the Linear Venturi Kinetic Nozzle Synfuel Production System for Rutgers University.

C. Rate of Interest and Repayment Terms

This Loan shall bear interest at the rate of twenty-five percent (25%) per annum. The Loan shall have a term of five (5) years. Interest only payments shall be made annually with a balloon payment of principal and interest being made at the end of the five (5) year term. The loan shall be paid according to the following schedule:

Year	Payment Due Date	Payment Due
1	March ___, 2016	$11,375.00
2	March ___, 2017	$11,375.00
3	March ___, 2018	$11,375.00
4	March ___, 2019	$11,375.00
5	March ___, 2020	$56,875.00 (includes principal repayment)

D. Payments

All payments shall be made to Lender at the address set forth above.

E. Late Charges

Lender is entitled to impose a late charge in the amount of ten percent (10%) of the amount of any installment not paid within fifteen (15) days from the date it becomes due and payable.

II. SECURITY

As security for the Borrower's performance hereunder, the principals of Borrower shall each execute a Guaranty and Suretyship Agreement guaranteeing the performance of the Borrower under the Loan Documents.

III. EVENTS OF DEFAULT

In addition to any other event referred to in this Agreement which constitutes an event of default, any one of the following shall be considered an event of default at the option of the Lender:

(a) Borrower shall fail to make any payment to Lender in accordance with the terms of this Agreement, the corresponding Promissory Note, or any other Loan Document upon the date when said payment is due and payable and such failure shall continue for a period of fifteen (15) days after notice of such failure has been given to Borrower by Lender.

(b) Borrower shall fail to observe and perform any of the covenants or agreements (except as to monetary defaults under the Loan Documents, since all monetary defaults are governed by sub-paragraph (a) above) which it is required to observe and/or perform under this Agreement or any other Loan Document within thirty (30) days of when such performance or observance is required.

(c) Any representation or warranty of the Borrower in relation to this Agreement or any of the other Loan Documents shall be untrue in any material respect.

(d) Borrower shall apply for, or consent to the appointment of a receiver, Trustee, or liquidator of itself or any of its property, admit in writing to its inability to pay its debts as they mature, make a general assignment for the benefit of creditors, be adjudicated bankrupt or insolvent, have an order for relief entered against it, file a voluntary petition in bankruptcy, or a petition or an answer seeking reorganization pursuant any bankruptcy, reorganization, or insolvency law or statute.

IV. REMEDIES

(a) Upon the occurrence of any event of default, the entire unpaid principal sum hereunder, plus all interest accrued thereon, plus all of the sums due and payable to Lender under the Loan Documents shall, at the option of Lender, become due and payable immediately without presentment, demand, notice of non-payment, protest, notice of protest or other notice of dishonor, all of which are hereby expressly waived by Borrower to the extent permitted by law.

(b) In addition to the foregoing, upon the occurrence of any event of default, Lender may forthwith exercise singly, concurrently, successively, or otherwise any and all rights and remedies available to Lender by law, equity, statute or otherwise.

(c) No right or remedy conferred upon or reserved to Lender under this Agreement or any of the Loan Documents, is intended to be exclusive of any other right or remedy, and each and every such right or remedy shall be cumulative and concurrent, successively or otherwise at the sole discretion of Lender, and shall not be exhausted by any one exercise thereof, but may be exercised as often as occasion therefore shall occur. No action of Lender shall be deemed or construed as an election of remedy which precludes the pursuit of any other such right or remedy.

V. ADDITIONAL RIGHTS GRANTED TO EPA MARKETING, LLC

In consideration of EPA providing the Loan hereunder, Borrower agrees to grant the following additional rights and compensation to EPA:

(a) EPA shall have a right of first refusal with respect to the financing of Duckweed's Synfuel Production Facility in Sparta, Georgia (the "Sparta Project"). To the extent EPA elects to exercise its right of first refusal and provides financing for the Sparta Project, EPA shall receive fifty percent (50%) of the net proceeds derived by Duckweed, Alchemy Oil, Duckweed-affiliated or other entity from the operation of the Sparta Project. Upon the funding of this Loan, the parties will memorialize the terms of the Right of First Refusal in a separate document. EPA will also be granted the right of first refusal to fund additional Duckweed projects upon the same terms as the Sparta Project.

(b) With respect to any other Duckweed project for which the parties have not otherwise agreed to EPA's compensation, EPA shall receive a residual payment of twenty-five

cents ($0.25) for every gallon of product produced by Duckweed, Alchemy Oil or other Duckweed-affiliated entity.

The foregoing rights are contractual in nature and shall survive the expiration or termination of this Agreement and Duckweed's repayment of the Loan pursuant to the Loan Documents.

VI. ADDITIONAL CONDITIONS

The following additional conditions shall become a part of this Agreement between the parties:

A. Reasonably Requested Documents

Borrower shall provide all documents as reasonably requested by Lender.

B. Notices

Any notices required or permitted to be given pursuant hereto, or in connection herewith, shall be deemed to have been fully given when addressed and sent by certified mail, postage prepaid to the addresses stated herein. The current addresses of the parties are:

EPA Marketing, LLC
P. O. Box 640
Effort, PA 18330

Duckweed USA, Inc.
P. O. Box 472
Berlin, NJ 08009

C. Pennsylvania Law to Govern

This Agreement and all of the Loan Documents shall be construed in accordance with and shall be governed by the laws of the Commonwealth of Pennsylvania.

D. Benefit of Agreement

This Agreement shall be binding upon and inure to the benefit of and be enforceable by the parties hereto, their respective successors and assigns. No other person or entity shall be entitled to claim any right or benefit hereunder, including without limitation, the status of a third-party beneficiary of this Agreement.

E. Integration and Priority

This Agreement and the Loan Documents constitute the entire agreement and understanding among the parties relating to the subject matter hereof, and supersede all prior proposals, negotiations, agreements and understandings relating to such subject matter. In

entering into this Agreement, Borrower acknowledges that it is not relying upon any statement, representation, warranty, covenant or agreement of any kind made by Lender, except for the agreements of Lender set forth herein.

F. Severability

The provisions of this Agreement are intended to be severable. If any provision of this Agreement shall be held invalid or unenforceable in whole or in part, all remaining provisions in this Agreement shall remain valid and enforceable and shall be binding upon all parties and their successors or assigns.

G. Jurisdiction and Venue; Waiver of Jury Trial

Borrower and Lender each hereby irrevocably consent to the jurisdiction of and venue in the Court of Common Pleas of Monroe County and the United States District Court for the Middle District of Pennsylvania. The parties further agree to waive any right to trial by jury in any controversy arising out of or relating to this Agreement and the Loan Documents.

[REMAINDER OF THE PAGE LEFT INTENTIONALLY BLANK]

(Signatures on the Following Page)

IN WITNESS WHEREOF, the Parties hereto have set their hands and seals as of the date first written above.

LENDER:
EPA MARKETING MANAGEMENT, INC

ATTEST:

By: _____

BY: _____
Edward P. Abraham
President

BORROWER:
DUCKWEED USA, INC.

ATTEST:

By: _____

BY: _____
Michael Rigolizzo
President

PROMISSORY NOTE

COMMONWEALTH OF PENNSYLVANIA, COUNTY OF MONROE, ss.

March 6, 2015

$45,500.00

FOR VALUE RECEIVED, in the principal amount of Forty-Five Thousand Five Hundred ($45,500.00) Dollars lawful money of the United States of America, **Duckweed USA, Inc.,** having an address of **P.O. Box 472, Berlin, NJ 08009** ("Maker"), hereby covenants and promises to pay to **EPA Marketing Management, Inc.**, having an address of P.O. Box 640, Effort, PA 18330 ("Payee"), or order, at Payee's address first above written or at such other address as Payee may designate in writing, the following amounts:

- Principal: Maker shall pay to Payee the Principal amount of Forty-Five Thousand Five Hundred Dollars ($45,500.00) Dollars, lawful money of the United States of America, to be paid on or before the Maturity Date;
- Interest: Maker shall pay to Payee Interest computed upon the Principal at the annual rate of Twenty-Five percent (25%), to be paid in annual installments of Eleven Thousand Three Hundred Seventy-Five Dollars ($11,375.00) Dollars, lawful money of the United States of America, commencing on March 6, 2016 ("Commencement Date"), and continuing on the 6th day of March of each year thereafter until March 6, 2020 on which all remaining principal and interest shall be paid in full.

Maker covenants and agrees with Payee as follows:

1. The Maturity Date as referenced herein shall be March 6, 2020.
2. Maker will pay the indebtedness evidenced by this Note as provided herein. Maker shall pay a late payment premium of ten percent (10%) of any principal or interest payment made more than fifteen (15) days after the due date thereof, which premium shall be paid with such late payment.
3. In the event any payment due hereunder shall not be paid on the date when due, such payment shall bear interest at the lesser of default rate of interest which shall be computed at the interest rate herein plus five percent (5%) per annum or the highest lawful rate permitted under applicable law, from the date when such payment was due until paid. This paragraph shall not be deemed to extend or otherwise modify or amend the date when such payments are due hereunder. The obligations of Maker under this Note are subject to the limitation that payments of interest shall not be required to the extent that the charging of or the receipt of any such payment by the holder of this Note would be contrary to the provisions of law applicable to the holder of this Note limiting the maximum rate of interest which may be charged or collected by the holder of this Note.

4. The holder of this Note may declare the entire unpaid amount of principal and interest under this Note to be immediately due and payable upon the occurrence of any event of default under the Loan Agreement securing this Note, beyond any applicable grace period provided for herein or in said Loan Agreement. Forbearance to exercise this right to accelerate the maturity of the principal indebtedness with respect to any event of default shall not constitute a waiver of said right as to any other or subsequent default.
5. Maker hereby waives presentment for payment, demand, protest, notice of protest, notice of nonpayment, and notice of dishonor of this Note. Maker consents that Payee at any time may extend the time of payment of all or any part of the indebtedness secured hereby, or may grant any other indulgences.
6. Any notice or demand required or permitted to be made or given hereunder shall be deemed sufficiently made and given if given by personal service or by Federal Express courier or by the mailing of such notice or demand by certified or registered mail, return receipt requested, with postage prepaid, addressed, if to Maker, at Maker's address first above written, or if to Payee, at Payee's address first above written. Either party may change its address by like notice to the other party.
7. This Note may not be changed or terminated orally, but only by an agreement in writing signed by the party against whom enforcement of any change, modification, termination, waiver, or discharge is sought. This Note shall be construed and enforced in accordance with the laws of Pennsylvania.

IN WITNESS WHEREOF, Maker has executed this Note as of the date first above written.

ATTEST:

By: _____

DUCKWEED USA, INC.

By: _____
Michael Rigolizzo
President

EXHIBIT

F

THIS GUARANTY AND SURETYSHIP AGREEMENT is made this __6th__ day of March, 2015 by Rudolph Behrens ("Guarantor") in favor of EPA Marketing Management, Inc. ("Lender"), to secure obligations of Duckweed USA, Inc. ("Borrower").

Lender has made a Loan (the "Loan") in the amount of Forty-five Thousand Five Hundred and 00/100 Dollars ($45,500.00), which Loan is evidenced by Borrower's Promissory Note (the "Note") of even date herewith. The Note is secured by a Loan Agreement (the "Loan Agreement") of even date from Borrower to Lender. Guarantor has agreed to execute and deliver this Guaranty.

NOW THEREFORE, in consideration of the making of the Loan by Lender to Borrower, and intending to be legally bound, Guarantor hereby agrees as follows:

1. In order to secure payment of the Note by Borrower, and the payment and performance of all other obligations of Borrower under the Note and Loan Agreement (collectively, the "Loan Documents"), Guarantor hereby irrevocably and unconditionally guarantees to Lender, and becomes surety to Lender for, the due and punctual payment and performance of all the obligations of Borrower, now existing or hereafter at any time or times incurred under the Loan Documents, or under any renewals, extensions or modifications thereof such obligations hereinafter are referred to individually as "Obligation" and collectively as "Obligations."

2. If any Obligation is not paid or performed by Borrower punctually when due, including, without limitation, any Obligation due by acceleration, Guarantor will, upon Lender's demand, immediately pay or perform such Obligation. Guarantor will pay to Lender, upon demand, all costs and expenses including, without limitation, reasonable attorneys' fees, which may be incurred by Lender in the collection or enforcement of the Obligations or of Guarantor's obligations under this Guaranty.

3. Guarantor hereby waives notice of acceptance of this Guaranty and any notice of default by Borrower with respect to the Obligations, and consents and agrees that Lender may at any time, and from time to time, in its sole discretion (a) extend or change the time of payment, and/or the manner, place or terms of payment, and/or the time, manner, place or terms of performance of all or any part of the Obligations, (b) settle or compromise with Borrower or others liable thereunder all or any part of the Obligations, and (c) take or refrain from taking such action as Lender may, in its sole discretion, deem to be in its best interest with respect to the Obligations, all in such manner and upon such terms as Lender may deem fit and without notice to or further assent from Guarantor, who hereby agrees to be and remain bound upon this Guaranty for the balance of the obligations, notwithstanding any such extension, change, settlement, compromise, surrender, release, renewal, extension or other action.

4. Guarantor agrees that no promises, representations, agreements, conditions or covenants have been made relating to this Guaranty other than those contained herein, and that no modification of the terms hereof shall be binding on Lender unless in writing signed by

RB

5. This Guaranty shall bind Guarantor and Guarantor's heirs, executors, administrators and assigns, and the benefits hereof shall inure to Lender, and Lender's successors and assigns.

6. This Guaranty shall terminate and be of no further force or effect upon the payment and performance in full of all of the Obligations of Borrower under the Loan Documents, provided that this Guaranty shall continue to be effective or be reinstated, as the case may be, if at any time payment of any of the Obligations is rescinded or must otherwise be returned by Lender upon the bankruptcy, reorganization or similar proceeding of relief of Borrower under state or federal law, all as though such payment had not been made.

7. This Guaranty is an instrument of suretyship and not merely a guaranty. Should Borrower at any time be in default under any obligation beyond any applicable notice and cure period, if any, Lender may proceed directly and immediately under this Guaranty against the Guarantor to the full extent of the amount or performance with respect to such obligation, without first being required to proceed against Borrower or any other person or entity, or against any other security for Borrower's obligations to Lender. The Guaranty and Surety contained in this Guaranty is absolute and unconditional, primary, direct and immediate, and shall be valid and binding upon Guarantor regardless of any invalidity, defect or unenforceability of or in the Loan Documents, any action or inaction by Lender, or any other circumstance which might otherwise constitute a defense available to, or a discharge or release of, Borrower, or a Guarantor, by operation of law.

8. If any provision of this Guaranty is found by a court of competent jurisdiction to be prohibited or unenforceable, such provision shall be ineffective only to the extent of such prohibition or unenforceability, and such prohibition or unenforceability shall not invalidate the balance of such provision nor the other provisions hereof, all of which shall be construed in favor of Lender in order to effect the provisions of this Guaranty.

9. This Guaranty shall be governed by the laws of the Commonwealth of Pennsylvania.

IN WITNESS WHEREOF, this Agreement has been executed the day and year first above written.

Rudolph Behrens 3-6-2015

Rudolph Behrens

EXHIBIT

G

From: B.E.A.R. Group
To: Michael Rigolizzo; Stef Longo; Frank Marx; Jim McMonagle
Cc: Jack Earley
Subject: withdrawal & notification
Date: Friday, June 19, 2015 10:08:50 AM

To whom it may concern,

In October 2013 I agreed to grant a limited-field-of-use license for my patent to Duckweed USA. I have recently discovered that Duckweed USA has raised roughly $150,000 without my knowledge.

Also, prior to any agreement with or funds raised by Duckweed USA, I erected and owned a fully operational Biomek demonstration unit located in Limerick, PA.

The Limerick unit has since been relocated to the Rutgers Aquaculture Innovation Center in North Cape May, NJ in order to provide a much higher profile as a demonstration site for various B.E.A.R. Oceanics patented technologies.

It should be noted that B.E.A.R. Oceanics, my company, made the agreement with Rutgers University with the intention of showcasing both B.E.A.R. Oceanics' and Rutgers Aquaculture Innovation Center's expertise to the world.

Unfortunately, after more than 18 months, Duckweed USA has made virtually no progress in utilizing my patent to create a viable business, i.e., in spite of having raised funds to do so.

For these, and other reasons, I am withdrawing from Duckweed USA and nullifying the letter-of-intent.

I will grant a new limited-field-of-use license on a site specific basis.

Rudolph Behrens, CEO

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www.beargroup.us/home

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